

APPLIED HEALTH ECONOMICS		
AHE 501	Economics of Health Insurance	Introduces the theories that underpin health insurance products. Discusses the impact of government policies on health insurance products. Explains the principles of cost-effectiveness analysis. Reviews approaches to health insurance used around the world. Discusses the potential impact of health insurance reforms.
AHE 502	Statistics I	Presents descriptive and inferential statistics, including sampling and probability and hypothesis testing. Presents general approaches to ANOVA, Chi-Square, t-tests and linear regression. Students are introduced to the SAS learning environment.
AHE 504	Economics Modeling I	Presents the foundation of cost-effectiveness models used to inform decision makers. Introduces decision analysis models and budget impact analysis. Discusses approaches for handling uncertainty and risk adjustments, determining probability values, costs, other key model parameters, and the importance of perspective in modeling and simulation. Considers the application and presentation of models to policy makers, providers, health care managers, and key stakeholders who have interests in modeled output and the quantification of economic values.
AHE 505	Statistics II	This course begins with an overview of the research process, research methods discusses how each step in the research process will determine which statistical methods will be needed to answer the research question. The remainder of the course will teach you how to analyze data using logistic regression, survival analysis, longitudinal methods and propensity scores.
AHE 506	Subjective Outcomes in Health Evaluation	Focuses on concepts, theory, and methods for measuring subjective health outcomes including symptoms, functional status and well-being, health-related quality of life, and satisfaction with health. Explores appropriate tools for measuring subjective health outcomes and considers the importance of evaluating the measurement characteristics of these tools. Covers current requirements for Patient-Reported Outcomes endpoint in filings with US regulatory authorities, including conceptualization, validation and evidentiary standards
AHE 507	Claims-based AHEOR	This course enables students to conduct AHEOR using managed care claims data. The course will discuss topics such as how quality may be assessed through claims data, how claims may be used to guide budget impact modeling, and how claims may be used to generate novel scientific findings. Students will be familiarized with the limitations of claims-based data, and strategies for working to overcome them.
AHE 508	International Health Technology Assessment: Evaluation & Evidence	This course is designed to offer a critical overview of Health Technology Assessments (HTAs) and a practical guidance for optimal evidence generation and synthesis activities from an international perspective. This course discusses the fundamentals of HTAs around the globe and their interface with regulatory bodies, describes the preparation processes for a global and local dossier including HEOR evidence generation activities, and elaborates the decision-making criteria of HTAs. Throughout the course, the evolving nature of HTA assessments throughout the life cycle of a health technology is emphasized.
AHE 509	Epidemiology & Evidence for Outcomes Research	Presents methods and means to evaluate occurrence of disease and effects of interventions on disease incidence, prevalence and outcomes. Covers conduct and synthesis of prospective and retrospective research in generating estimates of the benefits and harms of different interventions and strategies to prevent, diagnose, treat and monitor health conditions. Considers the strengths and weaknesses of research designs and statistical approaches to evidence assessments. Includes methodological challenges in observational research such as bias (systematic error) and confounding (mixing of effects). Discusses adjustments to deal with limitations of evidence and analytical strategies. Explores practical applications of epidemiological practice in outcomes research.

AHE 510	Advanced Research Methods for Applied Observational Studies	<p>Presents advanced methods for conducting observational studies using real-world data. Reviews contemporary usage of real-world databases, exposing students to data coding and classification systems, defining of study variables, and validation of codes in databases. Extensive attention given to techniques for mitigating bias and confounding including use of propensity-scores, disease risk scores, instrumental variables (IV), and interrupted time series designs.</p> <p>Students are expected to have an understanding of epidemiology principles, methods and knowledge of linear and logistic regression. Understanding survival analysis is a plus as some class readings involve time-to-event analysis. In addition, basic knowledge of SAS software will benefit students in some sections of the course.</p>
AHE 512	Economic Modeling II	<p>Reviews the key concepts of health technology assessment with a focus on cost-effectiveness analysis. Introduces statistical methods to inform decision processes for health interventions, presenting both foundational and more complex decision analytical models. Addresses search strategies to identify the evidence models synthesize and describes tools for assessing the quality of evidence. Covers key components of economic evaluation for the development and running of Excel-based models representing disease and treatment patterns, stages of clinical trials, and the objectives of a model.</p> <p>Prerequisite: AHE 504</p>
AHE 651	Capstone Research Project	Implementation of a project demonstrating ability to manipulate and analyze data to address an AHEOR research question.
AHE 652	Strategic Capstone Portfolio & Presentation	Presentation of a portfolio of experiences in the degree program to demonstrate proficiencies in AHEOR core competencies.
ARCHITECTURE		
ARCH 601	Introduction to Design	<p>This intensive foundation design studio course is an introduction to fundamental design principles and vocabulary, representational methods and skills, as well as process methodologies and problem-solving strategies. Lectures and readings will stress abstraction as a primary building block for future design studios. It is also an introduction to research as a tool for understanding programming and design.</p> <p>Prerequisite: Permission of the M.Arch Program Director required.</p>
ARCH 602	Introduction to Visualization	<p>In this complementary intensive course taken with ARCH 601, students will investigate and devise comprehensive strategies for visualizing and communicating ideas through a vast range of technologies and techniques. By integrating digital and conventional hand drawing methods, the student will learn the appropriate tool to employ at any given point in the design process to effectively communicate to self and to others.</p> <p>Prerequisite: Permission of M.Arch Program Director.</p>
ARCH 603	Seminar 1	M.Arch Seminar 1 introduces students to concepts of architectural theory, practice, representation and communication. The cumulative goal of this seminar series is to provide the academic scaffolding for the reflective development of a Master of Architecture student's research agenda. The course both compliments and builds upon the explorations taking place within ARCH 611 Design 1 studio.
ARCH 604	Seminar 2	M.Arch Seminar 2 continues the introduction of students to concepts of architectural theory, practice, representation and communication begun in M.Arch Seminar 1. The cumulative goal of this seminar series is to provide the academic scaffolding for the reflective development of a Master of Architecture student's research agenda. The course both compliments and builds upon the explorations taking place within ARCH 612 Design 2 studio.

ARCH 605	Architecture Fellowship	This course is designed to allow students to take the first step towards a more in depth comprehension of the design studio pedagogy. Students will be linked for the semester one-to-one with a section of a foundation design studio. By participation desk critique and the review process, as an Architecture Fellow rather than as the student, enrollment in this course will allow upper level students to share their knowledge with foundation students. In return, by revisiting the fundamentals as a Fellow, students will be able to reevaluate the work they are doing in their own coursework and to develop further their critical, analytical, speaking, and communication skills.
ARCH 611	Design I	This graduate-level studio concentrates on issues concerning "dwelling" and specific issues addressing residential design at multiple scales in the urban context. Emphasis is placed on designing dense, sustainable, and socially responsible housing and mixed-use urban communities as generators for urban growth and renewal. This course uses research and analysis of human patterns of occupancy and settlement as a means of exploration. Techniques of representation are further developed and refined. Prerequisite: ARCH 601 (Minimum Grade B-) and ARCH 602 & or permission of the M.Arch program director.
ARCH 612	Design 2	This foundation course focuses on building the landscape using the elements, principles and theories of architectural and landscape design. Concurrently, specific theoretical issues related to design, organization and the interrelationship of interior and exterior space are explored. A particular emphasis is placed on an experiential and intuitive design process. The importance of the building parti as a response to naturally occurring context is emphasized. Techniques of representation are developed and refined. Prerequisite: ARCH 611 (Minimum Grade B-) or permission of the M.Arch program director.
ARCH 613	Design 3	In this course, students will develop high-impact architectural design projects that explore the integration of society, buildings and the urban context. Projects focus specifically on community within the city by addressing issues related to sustainability, resiliency and equity. Students investigate socio-cultural and environmental aspects of the urban condition as they relate to access to resources, project programming and the implications of architectural design. The studio includes discussion of architectural history, theory and principles of sustainability as the basis for the making of urban architecture. Emphasis will be placed on the student's development of a critical and synthetic design process founded on research, engagement and innovation. Prerequisite: ARCH 612 (Minimum Grade: B- or better) or permission of the program director
ARCH 614	Design 4	In this course, students will develop high-impact architectural design projects that explore sustainable design principles and tectonic practices with an emphasis on environmentally responsible proposals. This course considers sustainability as a core value balancing architectural design, building performance, social equity and environmental resiliency. It seeks to utilize innovative interdisciplinary methodologies to foster a collaborative approach to designing sustainable built environments. The inherent properties of building materials & systems will be explored to understand their roles in informing the design process including structure, enclosure, and assembly. Students will generate solutions to design problems from a perspective which balances design decision making and building performance. Prerequisite: ARCH-613 (Minimum Grade B-) or SDN-622 or permission of the program director
ARCH 615	Design 5	This comprehensive course requires that students work in teams integrating constructional, structural and environmental systems in the design and documentation of a large and complex building. Students will research building type and systems precedents and their resulting impact on built form, analyze material properties, specify component building systems and apply codes and standards to fulfill technical, programmatic and aesthetic needs. Prerequisite: ARCH 614 (Minimum Grade B-)

ARCH 616	Design 6	<p>This required Master of Architecture course is the culmination of the design studio experience. The structure of the course is negotiated with a faculty advisor to inform student research leading to the development of an original comprehensive architectural design project within the structure of a supervised studio. This studio allows each student to pursue individual interests while requiring them to resolve formal, programmatic, and technical requirements.</p> <p>Prerequisite: ARCH 615 (Minimum Grade B-) and ARCH 630</p>
ARCH 619	High Performance Bldg Envelop	<p>This course explores future possibilities for advanced building envelopes as well as the properties of interior and exterior building materials and their relation to construction methods and detailing. The building envelope will be considered using the following criteria: architectural expression, sustainability, spatial order, performance, and user experience. The goal of these investigations is to develop new building envelope systems that integrate the construction process with structure, materials, climate, energy use, transparency, surface qualities, and aesthetics. Students will participate in an integrated design process leading towards the technical and architectural design of a high performance-building envelope.</p>
ARCH 620	Advanced Design Computation	<p>This course provides an overview of computational approaches in architectural design and focuses both on material and computational processes for design innovation. Topics range from parametric design; algorithmic design; digital fabrication. Weekly readings offer the foundation in contemporary computational design thinking that has come at the confluence of design, and various fields from the arts and sciences. Through experimentation students investigate various computational and material techniques that can be applied to larger proposals. A series of tutorials and workshops introduce advanced scripting, programming, modeling and fabrication techniques</p>
ARCH 621	Building Science for Façades	<p>This course will explore the function of building facades through the lens of building science and their specific response to dynamic internal and external loads. Understanding the performance of the building envelope including issues of local contexts, thermal and moisture control, solar exposure, day lighting, acoustics, material properties, and life-cycle requirements, is critical to understanding overall building performance. Various analysis and modeling tools, widely used in the façade construction and design industry will be introduced and discussed to provide a foundation for characterizing and assessing façade performance issues.</p>
ARCH 622	Visualization I: Digital Modeling for Arch	<p>The primary intent of this course is to establish the computer as an effective tool in the design and presentation process. The course will focus on two primary areas in this regard: visualizing design concepts in three dimensions and communicating those concepts in a manner consistent with studio level work. Each project will explore various methods of describing two and three dimensional objects and spaces.</p>
ARCH 623	Façades Construction	<p>The demand for more sustainable, efficient, and highly performative building envelopes is ever increasing, and simultaneously, design, fabrication, and construction methodologies are evolving at a rapid pace. As such, there is a demand for a higher level of specialization in the professional environment, particularly pertaining to façade design and construction. This course focuses on issues related to façade construction in the contemporary built environment. Various case studies will be presented and discussed to develop a working knowledge of materials, assemblies, detailing, specification-writing, and other issues related to contemporary facades in both new construction and retrofit conditions. Other exercises and a final project will be designed to facilitate a more in-depth knowledge of issues endemic to the façade construction continuum.</p>

ARCH 624	Visualization 2: Advanced Modeling	This advanced, computer-aided design, elective course focuses on complex 3D modeling, photorealistic rendering and virtual reality; with an emphasis on using 3D Studio advanced modeling and rendering software. Interactive media and digital imaging are introduced in order to increase effectiveness of student presentations. Students complete a series of specifically designed exercises of increasing difficulty leading to a final project of the student's choosing from a concurrent or earlier design studio.
ARCH 625	Design & Health Infrastructures	In this lecture course, students will actively examine the collaborative role designers, healthcare professionals and communities play in human-centered development. Students will execute case-studies on healthcare and public health design interventions in developing contexts, including designs of hospitals, healthcare facilities and urban environments; and critique various methodologies of user engagement. The course concludes with students identifying funding streams and developing action proposals at the nexus of health and design in response to social indicators of health outcomes.
ARCH 626	Design/Build	Through a combination of lecture and lab, students apply knowledge of building technologies and structural systems to the design and construction of a project at appropriate scale. Working under the supervision of faculty, students research, plan, and build their solution to a problem of topical interest.
ARCH 627	Visual: Experimental Modeling	This advanced digital elective course focuses on the direct correlation between digital techniques and the design process. Complex three-dimensional modeling, rendering, animation, design visualization and presentation are emphasized in the course methodology. Using a variety of softwares, students complete a series of exercises of increasing difficulty leading to a final project that demonstrates the culmination of the skills developed throughout the semester.
ARCH 628	Façade Tect-Dsgn,Bld, Prottype	This lecture/lab course provides a step-by-step overview of the stages in design, design development, detailing, prototyping and constructing of building components and building envelopes. Topics range from conceptualization of building envelopes, project planning and design, working with the development team, prototyping and the construction process. Through cases analysis and lectures presented by experts in building envelope design and construction, students investigate framing systems, glass technology, bonding technologies, building materials, fabrication methods and assembly methods.
ARCH 629	History I: Ancient to Medieval	By tracing significant historical themes, this course spotlights canonic examples of Western and non-Western architecture, interiors, and landscape design from Ancient times to the Medieval period. Major monuments of Europe, Asia, Africa, and the Americas are examined as solutions to technical problems, utilizing available materials, and as spatial and structural embodiments of cultural belief systems. Students acquire a working vocabulary for both analyzing and evaluating the built environment and material culture.
ARCH 630	Architectural Research Methods	This seminar is focused on understanding independent research, inquiry, analysis, design exploration and synthesis in architecture. Different approaches to research, hypothesis testing, design process, and systems for design will be presented and discussed. This course is structured around weekly seminars and workshops and interactions with faculty members to guide student research and lead to the development of a comprehensive final project. Students will be challenged to develop and prepare their research proposals for their final project. Permission of the program director required.

ARCH 631	Design, Development & Global Hlth	In this lecture course, students will actively examine the designer's role in global health, sustainability, and human-development initiatives; evaluating critical factors including population growth, environmental degradation, rural to urban migration, and human settlements. Students will examine the role of research to inform a design and implementation strategy; comparing various methods of engagement. Students will interpret the designer's role among different strategies of international aid and human development; while appraising strategies to develop healthy communities and landscapes. The course concludes with students formulating human development strategies in one of the topical areas of study.
ARCH 632	History 2 Renaissance/ Baroque Arch & Interiors	Focusing upon global changes relative to patterns of patronage, and the intersection of church and state, this course highlights significant examples of Western and non-Western architecture and interiors produced from the 14th through the mid-18th centuries. Each case study is situated within a broad historical context and understood as paradigmatic of a periods values and aspirations that are given concrete form through available materials, construction methods, and technologies. Students acquire a working vocabulary for both analyzing and evaluating architecture, interiors, and material culture Prerequisite: ARCH 629
ARCH 633	History 3 Early Modern Arch and Interiors	This course chronicles the impact of Enlightenment thinking and of the shifting definitions of modernity upon architecture and interior design by tracing the transition from Historicism to the International Style. New notions of progress and evolution; industrialization and urbanization; and debates concerning the role of the machine and the meaning of ornament are set against major technological advances. Students examine key theoretical texts and accomplish archival research on an historic structure in the Philadelphia area. Prerequisite: ARCH 632
ARCH 634	History 4 Modern/Contemporary Arch and Interiors	This course analyzes major movements and theoretical constructs that have dominated architecture and interior design from the post-World War II period until the present. Discussion focuses upon societal and environmental aspects? politics, economics, science and technology, psychology, etc. ? that shape the greater context for architecture, interiors and the allied arts. Students examine key theoretical texts to evaluate current thinking relative to issues such as sustainability, critical regionalism, phenomenology and the role of the digital in contemporary practice.
ARCH 640	Experimental Materials	This elective lab/seminar course is a hands-on exploration into the mechanical properties and aesthetic potential of materials in the built environment. The course encourages experimentation with both new materials and non-traditional use of existing materials toward the full-scale production of architectural objects and building components. Implications of craft and technology underscore research and production. Students complete several smaller individual projects and a larger group project of longer duration.
ARCH 641	Tech I: Materials & Methods	This course focuses on the presentation of the technical factors of construction that affect a building's structure. Students are introduced to and compare the nature and structural characteristics of the major construction systems of wood, masonry, steel and concrete. Structural principles, as well as building and zoning codes, are introduced and their influence on form and choice of materials is emphasized.
ARCH 642	Tech 2: Passive Systems / Building Enclosure	This lecture/lab course examines technological issues relevant to passive environmental systems and sustainable technologies. Central to the course is a students understanding of the temporal nature of program and site and their impact upon the design of natural lighting, passive heating and cooling systems, and issues of enclosure, materiality, and skin, as well as their relation to our natural and built environments. Prerequisite: ARCH 641

ARCH 643	Tech 3: Dynamic Environmental Systems	<p>This lecture/lab course presents basic theory and application parameters associated with the dynamic building systems within the architectural environment. These include HVAC, power and data, lighting, acoustics, security, plumbing, vertical transportation, and life and fire safety. Emphasis is placed on the relationships of these systems within the building structure and envelope, as well as the integration of design processes, the implementation of sustainable design principles, and the health, safety, and welfare of users.</p> <p>Prerequisite: ARCH 642</p>
ARCH 644	Tech 4: Advanced Building Analysis	<p>This lecture/lab is the capstone course to the Structures and Technology course sequences. This course presents advanced theory, design and application parameters associated with structures, environmental systems and enclosure within the architectural environment. These parameters are examined through the context of building form typology. Emphasis is placed on the relationships of structures, environmental systems and building enclosure within each building type, and the use of these design elements in the conceptualization and realization of architecture.</p> <p>Prerequisite: ARCH 643</p>
ARCH 645	Tech 5: Documentation / Detail	<p>This course focuses on the important role of structural, environmental, and constructional systems in the design process through the creation of technically precise computer generated drawings and models. Students systematically analyze precedence through case studies and develop their own design into a set of technical documents and details that enhance the project concept. The utilize CAD and BIM computer software to convey their technical design intentions.</p> <p>Co-requisite: ARCH 615 Prerequisite: ARCH 644</p>
ARCH 647	Experimental Structures	<p>This elective lab/seminar course is an exploration into the architectural potential of form-active structures (including thin-shell, tensile-membrane and fabric structures), and new and alternative materials and methods of construction. Unlike conventional structures that rely on their internal rigidity, form-active structures rely purely on their geometric shape to carry loads, thus providing a base for experimenting with form to create innovative solutions for structural-design problems.</p>
ARCH 651	Structures 1	<p>This course merges structural design (form) and analysis as a simultaneous act and introduces the role of structural engineering in the architectural process. Students develop familiarity with the fundamentals of statics, gain a sense of how structures resist forces, and learn to visualize the load path and the direction of forces. Material is learned while designing actual structures and details. Structural design and analysis is taught using both numerical and graphical analyses for the preliminary shapes of cable structures, arches, and trusses.</p> <p>Prerequisite: Approved university level Applied Physics and Applied Calculus coursework</p>
ARCH 652	Structures 2	<p>Reinforcing concepts learned in Structures 1, this course presents the effect of cross-sectional properties on stresses in beams as well as the concept of bending as it is applied to beams, columns, slabs and walls in wood, steel and reinforced concrete. Also covered are the resistance of buildings and their components to lateral loads (wind and earthquake) and the introduction to structural grids and patterns for structural systems in wood, steel and concrete as they relate to gravity and lateral loads.</p> <p>Prerequisite: ARCH 651</p>

ARCH 661	Professional Management	<p>This course focuses on the nature of the architect's practice and on office proprietorship typologies, through detailed studies of legal, financial, marketing and management issues. Using individual projects, it examines the project process - from development through construction, including administrative procedures, economic systems, codes, standards and regulations - as well as various professional disciplines' responsibilities and requirements for professional registration. Contractual and ethical obligations of the architect, particularly in response to client needs and safety, as well as codes, standards and regulations are covered.</p> <p>Prerequisite: MARCH 615 or permission of the program director.</p>
ARCH 670	Issues in Contemporary Architecture	<p>Through discussion and field trips, this seminar investigates selected topics that have dominated architectural thinking during the 20th and 21st centuries. The course focuses upon major issues that continue to influence both the meaning and practice of contemporary architecture, such as: patterns of settlement and the city; the relationship between architecture and place making; the impact of technology and the digital realms; the spatial and sensory experience of buildings; sustainable design; and the role of adaptive reuse and historic preservation, to name a few. Students will critique contemporary theory and practice to develop their own architecture and design theory.</p>
ARCH 671	Vernacular Architecture	<p>This elective course provides the groundwork for the study of architecture built without architects or, in some other way, unlike the buildings that comprise the standard architectural canon. Scholars estimate that 95 percent of buildings fall into this category. Depending on faculty expertise, focus will be on national and regional traditions, non-Western traditions or a combination of the two. Examples of vernacular architecture will be examined in the context of their materials, building technology, climate and culture.</p>
ARCH 672	American Architecture	<p>What makes the built environment in America unique? How has American design changed over the generations? What were architects, clients, and critics thinking? Where will American architecture go in the future? Using history, sociology, and the humanities, we will address these types of questions as we examine American architecture according to themes such as the iconic American home, public buildings, buildings for work and play, and American architectural practice.</p>
ARCH 673	The Great American City	<p>The American city is examined from multiple viewpoints - historical, theoretical and critical - and with respect to specific communities, as well as to general issues. Themes include the initial founding of settlements and their growth, the architectural character of the communities and how character relates to the socioeconomic and physical environments, and the contribution of all these factors toward the specific image or reputation associated with America's best known or "most typical" cities and towns. Field trips vary by semester and are required.</p>
ARCH 771	Independent Study & Research	<p>This course will allow students to pursue individual areas of interest while working jointly with a faculty member. Enrollment is subject to the availability and approval of both the program director and faculty member. The student must have 12 or more graduate-level credits, and a prospectus of the proposed independent study must be approved at least one month prior to registration</p>
ARCH 771A	Independent Study & Research	<p>This course will allow students to pursue individual areas of interest while working jointly with a faculty member.</p>
ARCH 771B	Independent Study & Research	<p>This course will allow students to pursue individual areas of interest while working jointly with a faculty member.</p>

ARCH 791	Internship and Research	Academic internships aid students in professional preparation through a work experience directly related to their major and career goals. This upper-level elective course is designed to facilitate and support a student's academic internship experience. While the primary emphasis of the course is on the internship work experience, course assignments are incorporated to prompt reflection on the internship. This reflection is an integral component of experiential learning and students' overall career and professional development and aligns with the course learning outcomes.
ARCH 901	Graduate Thesis Project I	This independent research course is the first of the sequence of courses focused on independent research, inquiry, design exploration and synthesis for the graduate thesis project. The structure of the course is negotiated with your faculty advisor to inform student research leading to the development of a comprehensive thesis project. Emphasis will be placed on developing your independent research project creating a clear structure and schedule to advance toward completion of the graduate thesis project. Consent of faculty advisor required
ARCH 901A	Graduate Thesis Project I	This independent research course is the first of a possible two course sequence of Project 1 courses focused on independent research, inquiry, design exploration and synthesis for the graduate thesis project. The structure of the course is negotiated with your faculty advisor to inform student research leading to the development of a comprehensive thesis project. Emphasis will be placed on developing your independent research project creating a clear structure and schedule to advance toward completion of the graduate thesis project. Consent of faculty advisor required.
ARCH 901B	Graduate Thesis Project I	This independent research course is the second of a possible two course sequence of Project 1 courses focused on independent research, inquiry, design exploration and synthesis for the graduate thesis project. The structure of the course is negotiated with your faculty advisor to inform student research leading to the development of a comprehensive thesis project. Emphasis will be placed on developing your independent research project creating a clear structure and schedule to advance toward completion of the graduate thesis project. Consent of faculty advisor required
ARCH 902	Graduate Thesis Project II	In this culminating course, students will work under the guidance of a faculty advisor on a research project that will focus on the continuation and completion of the thesis project begun previously while demonstrating in-depth research ability at a graduate level. Students will be required to focus on specific details and features of their project. If agreed to by the program director, students will present their final project in a public forum and generate a final "book" (using the most current Philadelphia University Guide For The Preparation Of Doctoral Dissertation And Master's Theses document) that includes all of the work completed during the graduate thesis project sequence. For a building design project, students will be required to present their project research results as part of the final requirements for graduation. Prerequisites: ARCH 901 and consent of faculty advisor required.
ARCHITECTURE & DESIGN RESEARCH		
ADR 701	Research Theories & Methods 1	This seminar considers architectural research as both a professional and scholarly activity that deploys systematic, interdisciplinary inquiry as a means of gaining knowledge and answering questions related to the design of the built environment. An overview of theories and methods, the course surveys a wide array of principles, techniques, and strategies employed in architectural research, as well as the philosophical positions, paradigms and interpretive lenses that influence choice of topic and inform research. The goal is to help students to understand the process of research design that involve identifying an area of inquiry through literature review, defining a preliminary research question, and a corresponding methodology.

ADR 702	Research Theories & Methods 2	This seminar explores the next steps in the research process. Students refine a field of inquiry through literature review, further define a preliminary research question, and a corresponding methodology. Working with both faculty and professional advisors, each student investigates current debates relative to the topic, significant case studies and core literature, in addition to topic-specific research strategies. Course is preparation for the Preliminary Exam in which students must demonstrate overall competency in principles, theory, practices, methodologies and core literature.
ADR 898	Directed Research Seminar	This seminar explores the next steps in the research process. Students refine a field of inquiry through literature review, further define a preliminary research question, and a corresponding methodology. Working with both faculty and professional advisors, each student investigates current debates relative to the topic, significant case studies and core literature, in addition to topic-specific research strategies. Course is preparation for the Preliminary Exam in which students must demonstrate overall competency in principles, theory, practices, methodologies and core literature.
ADR 8xx	Dissertation Proposal	This seminar supports development of a dissertation prospectus. Building on previous coursework, students refine their literature review, research question, methodology, value proposition, and develop a prospectus working with the dissertation committee. This course is preparation for the Dissertation Proposal Defense in which students must defend a dissertation prospectus that demonstrates their readiness and specific plan to conduct the research.
ADR 8xx	Dissertation Research/Writing	The student will conduct independent research and develop the dissertation under supervision of the primary advisor and the dissertation committee in satisfaction of the Ph.D. degree requirement.
ADR 8xx	Special Topics	This course allows to offer exploration of new topics related to strategic areas in the Ph.D. in Architecture and Design Research program that expand or augment existing courses in the graduate catalog. The course incorporates adequate delivery methods and satisfies program learning outcomes supporting doctoral level research. Permission by instructor
ATHLETIC TRAINING		
ATP 600	Emergency Care	This course prepares the athletic training student to respond to medical emergencies and acute or otherwise emergent conditions. Through successful completion students will be able to perform assess and manage a variety of life-threatening and emergent conditions. Prerequisites: Admission into the Master of Science in Athletic Training Program. This is a required course in the Master of Science in Athletic Training Program.
ATP 601	Current Concepts in Emergency Care	This one credit, in person, course is designed to coincide with HSCI 610- Emergency Medical Responder. This course is will prepare the entry-level athletic trainer in current standards of pre-hospital emergency care. Major focus will be spent on the top causes of sudden death, injury and illness in the physically active population. ATP 601 will build upon the knowledge gained in HSCI 610 and provide deeper understanding of emergency conditions specific to the physically active, as well as current evidence and guidelines specific for athletic trainers' role in the prevention, recognition and treatment of these injuries and illnesses.

ATP 602	Scientific Writing and Inquiry	This course is designed to coincide with courses ATP 600, ATP 601 and ATP 605 within the Masters of Athletic Training Program. The corresponding course assignments regarding both final project papers are to be a supplementation involving those previously mentioned courses in order to provide the necessary tools to prepare the athletic training student to effectively critique current evidence-based research. Through successful competition students will be able to appropriately select appraisal tools and designate the level of evidence for articles which will be used to complete research papers related to content learned in HSCI 610, ATP 601 and ATP 605. This is achieved through the formation of PICO(T) questions through the Boolean search phrases in order to narrow down search results during literature reviews. This course will give students valuable experience in research design, data collection and/or analysis by completing this course assignments in alignment with other course projects.
ATP 605	Fundamentals of Athletic Training	This course is designed to introduce students to the profession of Athletic Training. This course provides an introduction to injury prevention, recognition, and treatment strategies. Injury prevention principles, injury classification, and common injuries will be surveyed. Prerequisites: Have met all admission criteria for the Master of Science in Athletic Training Program
ATP 610	Basics of Rehabilitation	This course will introduce the student to basic clinical skills and problem-solving abilities to be built upon in future course work. It is designed to introduce the student to hands-on patient care skills in a laboratory setting. These skills include but not limited to: assessment of vital signs; principles of body mechanics; range of motion and manual muscle testing assessment; transfers; assistive device fitting and education; gait assessment and training. The students will also have the opportunity to apply this knowledge immediately during clinical experiences. Prerequisites: Admission into the Master of Science in Athletic Training Program
ATP 615	Functional Human Anatomy	This course provides an in-depth study of musculoskeletal anatomy and function as it applies to human performance and dysfunction. Emphasis will be placed on the study of the structure and functional significance of the human body - with emphasis on neural, musculoskeletal and cardiopulmonary systems. This course will provide an introduction to clinical application of relevant anatomy, with respect to some common conditions seen in the health/medical profession.
ATP 620	Practicum I	This course is designed to provide introductory hands-on experience in the field of Athletic Training. Upon completion, the student will have a novice understanding of the recognition, evaluation and treatment of injuries and illnesses. Under the direct supervision of a preceptor, the student will be challenged to transfer knowledge learned didactically and apply it in clinically.
ATP 625	Prevention, Evaluation & Treatment of Athletic Injuries I	A systematic approach to orthopedic/sports assessment and rehabilitation will be examined. The upper extremity will be studied in-depth stressing anatomy, neurology, physiology, etiology, pathology, assessment and rehabilitation techniques. This course will also examine the knowledge, skills and values the entry-level Athletic Trainer must possess to plan, implement, document and evaluate the efficacy of therapeutic exercise programs for the rehabilitation and reconditioning of upper extremity injuries and illnesses of athletes and the physically active. Assessment techniques will be presented and discussed in a didactic manner as well as applied through lab experiences.
ATP 630	Therapeutic Modalities for Athletic Training	This is a comprehensive course in the theory and use of therapeutic modalities in a sports medicine setting. Students will learn about the injury response cycle and healing process and how to incorporate modalities to these processes. The student will have an in-depth understanding of the physiology behind the therapeutic effects. Students will become proficient as far as application, electrode placement, patient set-up and parameters of modalities used in sports medicine. Principles of neurophysiology, pain control, and the electromagnetic and acoustic spectra will be discussed and applied through lab experiences.

ATP 635	Human Physiology: Exercise, Nutrition & Performance	This course provides an in-depth structure/function relationship of the neuromuscular, metabolic, cardiorespiratory and hormonal responses to acute exercise and the physiological adaptations to chronic exercise. Topics include thermoregulation, ergogenic aids, body composition, sport training, growth and development, and aging.
AT 640	Practicum II Athletic Injuries I	This second clinical rotation allows for the student to gain more hands-on clinical experience in the profession of Athletic Training outside of the classroom and in the clinical setting. This rotation is designed to provide the athletic training student hands-on experiences with which to understand, recognize, evaluate, and treat athletic injuries and illnesses using the range of skills required of an athletic training professional. Under the supervision of a preceptor, the student will be challenged to transfer knowledge learned didactically and apply it in the clinical setting.
ATP 645	Motor Control and Human Movement Training	This course guides the study of the principles of motor skill performance and learning and the application of these theories to physical activities, learners and various environments. This course will also examine the structural and mechanical principles involved in human movement and the contribution of these principles to the efficiency of human movement.
ATP 660	Specialty Practicum in Athletic Training	This clinical rotation allows for student to gain advanced clinical experience in the profession of Athletic Training outside of the classroom and in the clinical setting. This rotation is designed to provide the athletic training student with immersive hands-on experiences with which to understand, recognize, evaluate, and treat NON-athletic and NON-orthopedic injuries and illnesses as required by CAATE standards using a range of skills required of an athletic training professional.
ATP 661	Practicum III Athletic Injuries	profession of Athletic Training outside of the classroom and in the clinical setting. This rotation is designed to provide the athletic training student with immersive hands-on experiences with which to understand, recognize, evaluate, and treat athletic injuries and illnesses using the range of skills required of an athletic training professional. Under the supervision of a preceptor, the student will be challenged to transfer knowledge learned didactically and apply it in the clinical setting in an immersive manner.
ATP 662	Practicum IV	This clinical rotation allows for student to gain advanced clinical experience in the profession of Athletic Training outside of the classroom and in the clinical setting. This rotation is designed to provide the athletic training student with immersive hands-on experiences with which to understand, recognize, evaluate, and treat athletic injuries and illnesses using the range of skills required of an athletic training professional. Under the supervision of a preceptor, the student will be challenged to transfer knowledge learned didactically and apply it in the clinical setting in an immersive manner.
ATP 665	Prevention, Evaluation, Treat of Athletic Injuries II - Lower Extremities	A systematic approach to orthopedic/sports assessment and rehabilitation will be examined. The lower extremity will be studied in-depth stressing the anatomy, neurology, physiology, etiology, pathology, assessment and rehabilitation techniques. This course will also examine the knowledge, skills and values the entry-level Athletic Trainer must possess to plan, implement, document and evaluate the efficacy of therapeutic exercise programs for the rehabilitation and reconditioning of lower extremity injuries and illnesses of athletes and others involved in physical activity. Assessment techniques will be presented and discussed in a didactic manner as well as applied through lab experiences

AT 670	Prevention, Evaluation, Treat of Athletic Injuries - III - Spine	A systematic approach to orthopedic/sports assessment and rehabilitation will be examined. The head, neck and spine will be studied in-depth stressing the anatomy, neurology, physiology, etiology, pathology, assessment and rehabilitation techniques. This course will also examine the knowledge, skills and values the entry-level Athletic Trainer must possess to plan, implement, document and evaluate the efficacy of therapeutic exercise programs for the rehabilitation and reconditioning of the head, neck and spine injuries and illnesses of athletes and others involved in physical activity. Assessment techniques will be presented and discussed in a didactic manner as well as applied through lab experiences.
ATP 675	Strength and Conditioning	This course includes a functional, scientific approach to the design of strength and conditioning programs. Includes testing protocols used for measuring fitness, body composition, posture, flexibility, muscular strength, power, speed, and endurance. General fitness, wellness, and sports nutrition concepts and dietary supplements will be discussed.
ATP 685	Organization & Administration in Athletic Training	Design to educate student on topics that focus on understanding the dynamics of a complex healthcare system with regards to the delivery and management of individualized patient care, Principles of organization and administration of athletic training programs; management of personnel; legal aspects; relation of athletic trainer to athletic programs and sports medicine team.
AT 690	General Medical Conditions & Pharmacology in AT	This course provides the student a thorough understanding of injury, illness and/or disease of various body systems; specific understanding of medical diagnostics, interventions (including pharmacology) and participation considerations for the athletic population are addressed. The student will be able to recognize, assess, differentially diagnose, know when to refer and treat different illness/condition in patient populations through various learning modalities including but not limited to lectures, hands on skills, laboratory experiences, and so on.
ATP 691	Research-Collaborative Project I	This course will give students valuable experience in research design, data collection and/or analysis by playing an integral role in a faculty sponsored research project or collaborating with graduate or undergraduate students from another program on a collaborative project relevant to sport medicine anywhere on campus.
ATP 692	Research-Collaborative Project II	This course is a continuation of Research/Collaborative Project. Students will finish their research projects and focus on writing their manuscript for a peer reviewed journal. This course is designed for the student to collaborate with other students/faculty from different departments on campus to complete their projects.
ATP 695	Psychological Aspects of Injury & Rehab	This course focuses on understanding the psychological factors relative to exercise, injury, inactivity, and rehabilitation following injury. Strategies for identifying problems, intervening, and making referral are presented.
ATP 696	Special Topics in Athletic Training	An in-depth study of particular topics, contemporary issues or concerns in Athletic Training. The course will be taught by a specialist(s) in the field related to the topic.
BIOPHARMACEUTICAL PROCESS		
BP 601	Basic Engineering for Scientists	This course introduces students to the basic underlying transport processes of momentum, mass and heat transfer pertinent to biopharmaceutical process development. The course will demonstrate the power of mathematical techniques, modeling and statistical methods to resolve practical issues in a biomufacturing setting.

BP 603	Introduction to Bio-pharmaceutical Processing	This course introduces students to the biopharmaceuticals, also known as biologics, with specific examples including peptides, proteins and monoclonal antibodies for diseases including cancers, diabetes, rheumatoid arthritis's, Alzheimer's', heart-related diseases and many more. Students will be introduced to real world examples using process history and development of commercial biologics to provide the basis for a "phase appropriate" approach to process development in biomanufacturing and why in the case of biologics, the process is the product.
BP 604	Introduction to Downstream Unit Operations	This course introduces students to industrial applications of chromatography for purification and polishing and tangential flow filtration (TFF) for product formulation and concentration. The course will also introduce students to other key areas in downstream processing of therapeutic peptide, proteins and monoclonal antibodies including viral safety, active pharmaceutical ingredient (API) stability and API stability storage.
BP 605	Introduction to Upstream Unit Operations	This course introduces students to the practical use of cells cultured in bioreactors to produce sophisticated biopharmaceutical medicine including peptides, proteins and monoclonal antibodies for variety of diseases including cancers, diabetes, rheumatoid arthritis, scoliosis, to name but a few.
BIOTECHNOLOGY		
BT 503	Molecular Preparatory Techniques	Basic aspects of biotechnology laboratory work: gel preparation, buffer composition, media preparation, streaking and isolating bacteria. Lecture and laboratory.
BT 510	Fundamental Molecular Techniques	Discussion, demonstration and practice of basic molecular techniques including DNA/RNA isolation, restriction digest, gel electrophoresis and blotting techniques. Lecture and laboratory. Corequisite: BT 303/503
BT 520	Cell and Tissue Culture Techniques	Sterile technique, suspension and adherent culture, growth curve, cryopreservation, cell cycle analysis, imaging, laboratory safety and documentation. Lecture & laboratory.
BT 525	Product Development & Management	This course will cover the principles of product development and management in biotechnology with a focus on medical devices. All products undergo a product life-cycle from concept to marketplace. Students learn about the steps needed to develop and manufacture a product with all the necessary regulator mechanisms for the marketplace. Concepts covered include market analysis, feasibility testing, validation testing, the development of a quality management system, and the FDA approval process using good laboratory, clinical, and manufacturing practices.
BT 601	Systems Biology	Cross-disciplinary course combining flow cytometry, digital imaging technologies, bioinformatics and molecular modeling aimed at understanding organisms as a whole. Presents methods by which specific biological information relating to DNA, RNA, proteins, cells and tissues are integrated and modeled. Prerequisite: LMS 301/501 or permission of Program Director
BT 603	Human Genetics	This course will cover the principles and theory of human genetics. Specific topics to be covered include: introduction of human genetics, the genome structure and maintenance; review of DNA replication, RNA transcription, and protein synthesis; transmission of genes and genetic traits; population genetics; the role of genetics in immunity and cancer; applications of genome sequencing, diagnostic technology, and therapeutic technology; and the practice of the scientific communication of human genetic concepts via literature research and oral presentation.

BT 605	Microbial Genetics	Specialized topics in microbiology and molecular genetics. Examines the biology of human bacteria, yeast and viruses with special emphasis on their use in molecular genetics. Lecture/seminar. Corequisite: LMS 301/501
BT 606	Introduction to Bioinformatics	Introduction to the concepts of computer based molecular modeling, genomics, proteomics and bioinformatics and their applications in research and diagnostics. Course will utilize lectures, demonstrations and practice in the principles of computer based molecular modeling and genetic analysis.
BT 610	Molecular Diagnostic Techniques	Introduces clinical applications of molecular techniques. Includes discussion, demonstration and practice of molecular techniques including detection of gene mutations, oncogene amplification and loss of tumor suppressor gene function. Covers advanced techniques such as forensics, probe development and cloning and sequencing. Lecture & laboratory. Prerequisite: BT 310/510
BT 611	Protein Purification and Characterization	Introduction to theory and applications of protein purification, characterization, and enzymology. Students perform various types of chromatography, gel filtration, ion exchange chromatography, affinity chromatography, protein assays, protein analysis, SDS PAGE, spectroscopic methods, and enzyme kinetics. Lecture & laboratory. Prerequisite: BT 310/510
BT 812, 813, 814, 815	Biotechnology Practica I, II, III, IV	Graduate practical internships in biotechnology laboratories. Students participate in all phases of laboratory functions relating to the various applications of biotechnology including, but not limited to, molecular diagnostics, basic and applied research and forensics. As appropriate, students will also participate in relevant continuing education activities, attend seminars and engage in other professionally related activities. Prerequisite: Completion of pre-practicum biotechnology and core curriculum coursework.
BT 816	Comprehensive Examination	Background readings, comprehensive review and self-administered quizzes/exams in the discipline-specific body of knowledge and scope of practice necessary to prepare for national certification examination(s). Web-based course. Prerequisite: Completion of at least two practicum courses.
CANNABIS		
CBU 501	Emerging Issues in Cannabis Industry	Students will learn about and engage in course activities related to the history of cannabis and the rapidly developing trends in cannabis business, laws, regulations and ethics. In particular, students will examine emerging practices, concepts and issues in the cannabis industry relating to regulatory framework, financial aspects, taxation, employment and workforce development, and social justice and equity
CBU 506	Essentials of Cannabis Financial and Operations Analysis	This course introduces the use of accounting information as a basis for planning, control, and managerial decisions. In particular, students will gain an understanding of core accounting concepts, financial statements, and how to make financing, investing, and operating decisions that will create value for organizations. The course also discusses the role of inventory management in supply chain and logistics
CCT 508	Quality Control and Quality Assurance in Medical Cannabis Analysis and Dispensing	The main focus of this course will be on quality control (QC) and quality assurance (QA) in the cannabis testing laboratory. The course will explain the different tests performed on cannabis (e.g. potency/cannabinoid concentration, terpenes, etc.), best practices, method development and validation, laboratory accreditation, and how to build and implement a good quality management program.

CMD 503	Pathology Potentially Responsive to Cannabis	This course will review the current knowledge base of pathology and pathophysiology for disease states and symptoms for which the endocannabinoid system and its components may have a biologically plausible role. The discussion will include primarily neurologic, psychiatric and behavioral, gastrointestinal and hepatic, gynecologic, musculoskeletal, hematologic, and oncologic conditions, as well as overlapping and blended diagnoses.
CMD 504	Conventional & Cannabinoid Therapy of Disease	This course will review the current knowledge base of conventional treatment for disease states and symptoms for which cannabinoids may have a biologically plausible role. The course will also cover the use of cannabinoids in the stated conditions. The discussion will include neurologic, psychiatric and behavioral, gastrointestinal and hepatic, gynecologic, musculoskeletal, hematologic, and oncologic conditions, as well as overlapping and blended diagnoses.
CMD 505	Health Implications of Cannabis and Cannabinoids	The purpose of this course is to review potential adverse effects of cannabinoids that may be related to route of exposure/administration, drug-drug interactions, individual physiology, and other factors that require full exploration if students are eventually to advise patients on how best to use available cannabinoid therapy safely. The course will take a systems-based approach characterizing effects on function in the areas sensorimotor, cognition and affect, hepatic and cardiovascular, to name a few.
CRS 600	Applied Research Design & Methods	The purpose of this course is to teach basic research skills and concepts needed to plan, conduct, and analyze data from a research project. Quantitative, qualitative, mixed method approaches to research will be introduced, as well as ethical issues in conducting research. Using the framework of the research project proposal, this course will focus on how to identify emerging research topics, state research objectives, perform scientific literature searches, derive variables, state hypotheses, develop an appropriate study design, and conduct basic statistical analyses
CRS 610	Cannabis Capstone Project	In this course students will apply knowledge and skills acquired throughout the entire program of study, to develop and conduct a professional and comprehensive research project in an area of their interest in the cannabis field. Working with a faculty mentor, students will make connections among concepts, ideas and experiences gained from the cannabis medicine, science and business courses and apply them to their research project. This course should be taken during the final semester of study and will culminate in a final paper and a virtual presentation
CSC 511	Botany & Chemistry of Cannabis	This course focuses on the Botany and Chemistry of Cannabis. The course will cover the history of cannabis as a medicinal plant from ancient times until today, taxonomy, macro and microscopic characterization, cultivation, storage, tissue culture and cryopreservation of genetic material. The color tests used to identify the cannabis plant will be described and the course will also elaborate on the chemical constituents of cannabis with emphasis on the different chemical classes and their biosynthesis, especially the cannabinoids and terpenes. Furthermore, the course will elaborate on the different chemovars of cannabis and the trends in potency changes in the illicit market over time in the USA. The course will require students to critically review and present publications in small groups and complete assignments.
CSC 512	Forensic Analysis of Cannabinoids & Cannabis Derived Products	This course will review and apply practical concepts important to successful chemical analysis of cannabis plant materials, products and other samples relevant and pertaining to cannabis. The course will open with a focus on the importance of sample preparation and the various strategies employed for samples which range from plant materials to oils, edibles, drinks, etc. This topic will be followed by the concepts of chromatography including capillary gas chromatography (GC) and high-performance liquid chromatography (HPLC) coupled with various detectors. Importantly, mass spectrometer (MS) detectors will be discussed in considerable detail for a full understanding and appreciation for the merits of GC/MS and LC/MS including tandem mass spectrometry (GC/MS/MS and LC/MS/MS). Student will gain an understanding and appreciation of the analytical techniques associated with modern chemical analysis of cannabis and cannabis-related samples.

CSC 513	Cannabinoid Pharmacology	This course will review the endogenous cannabinoid system that modulates multiple other neurotransmitter system functions placing this system into an important regulatory role. The pharmacology of the many natural cannabinoids in the cannabis plant are also explored including Δ^9 -tetrahydrocannabinol (THC), the primary psychomimetic compound in cannabis and cannabidiol (CBD) the primary therapeutic candidate. Cannabinoid pharmacokinetics by different routes of administration are investigated for medicinal and/or recreational intake.
CSO 521	Cannabis & Public Health	This course will provide an overview of the historical and contemporary relationship between cannabis and public health. Topics included in this course encompass a grounding of the role of cannabis in the War on Drugs. The course will cover the personal and environmental factors related to cannabis use. The course will introduce students to cannabis use within a range of legal and illicit substances that are used by people for recreational and medicinal purposes. Finally, issues around cannabis policy at the local, state and federal level will be discussed. The course combines pre-recorded lectures, discussion boards, and virtual meetings
CSO 522	Cannabis Policy, Politics, and Regulation	Contact program for more information
CSO 523	Cannabis Social Justice and Equity Policies: Evaluating impact and Outcome	Contact program for more information
CARDIOVASCULAR PERFUSION		
PER 500	Perfusion Technology I	This course is designed as a comprehensive course in Perfusion Technology I. Students will be exposed to general perfusion science topics and principles to build a learning foundation for their perfusion education. Throughout the semester, students will be afforded the opportunity to utilize the knowledge provided and participate in various clinical scenarios in the high-fidelity simulation laboratory.
PER 510	Human Physiology	The primary goal of this course is to provide clinical perfusion students with basic medical physiology information and to impart an understanding of how physiological systems operate and influence the human organism. The information provided will allow the clinical perfusionist to understand why the human organism reacts to various situations including reactions to drugs and surgical procedures.
PER 520	CV Anatomy	Introduction to the basic principles of drug action, including molecular mechanisms, time and dose dependency of drug actions, pharmacokinetics, toxicity, resistance and tolerance, pharmacogenetics, mutagenesis, carcinogenesis, and drug development and evaluation.
PER 522	General Pharmacology	Introduction to the basic principles of drug action, including molecular mechanisms, time and dose dependency of drug actions, pharmacokinetics, toxicity, resistance and tolerance, pharmacogenetics, mutagenesis, carcinogenesis, and drug development and evaluation.
PER 530	Medical Ethics	This course is designed to promote high level discussions among students on medical ethics and how such topics can affect how they practice as allied health professionals. Medical Ethics is designed as an online course, where students are afforded the opportunity to research relevant ethical principles and topics and conduct professional, well-articulated online conversations with their peers.

PER 540	Patho-physiology	Surgical procedures to correct defects will be discussed, as well as a review of the anatomy. Some of the topics covered in this course include Marfan's Syndrome, hypertension, atherosclerosis, carotid artery disease, diabetes, cardiomyopathy, heart failure, aneurysms, valvular heart disease, endocarditis, rheumatic heart disease, and so forth.
PER 550	Perfusion Basic Science Review	This course is designed to help second year perfusion students review for their American Board of Cardiovascular Perfusion (ABCP) examinations. Content to be reviewed consists of information already obtained from Perfusion Technology I and II, Pharmacology, Pathology, Physiology, and Anatomy. Students will participate in developing power point lectures (or review handouts) and review quizzes to help prepare for their exam.
PER 600	Perfusion Technology II	This course is designed as a comprehensive course in Perfusion Technology. Successful completion of Perfusion Technology I is required to take this course. During this course, students will be exposed to the equipment and disposables used by perfusionist for specialized procedures, gain a strong understanding of the pediatric patient, special procedures, and how to deal with both emergency and catastrophic situations. In addition, students will pick a perfusion topic of interest and present their research paper.
PER 620	Pharmacology for Perfusion	Contact program for more information
PER 640	Applications of ECMO & VAD	This online course concentrates on educating perfusion students on mechanical circulatory support devices. Students will be educated on the utilization of ventricular assist devices (VADs) and extracorporeal membrane oxygenation (ECMO). In addition, students will be exposed to VADs and ECMO with both high fidelity simulations and clinical exposure.
PER 650	Organizational Leadership	The Organizational Leadership course will focus on the tools and strategies necessary to become an effective leader. While the focus will be on how these strategies can be used within a large or small perfusion group, their origin is based on effective management and leadership within any organization of any size
PER 660	Foundations of Biostatistical Methods	This course provides an overview of biostatistical methods, and gives students the knowledge and skills to perform, present, and interpret basic statistical analyses. Topics include basic descriptive statistics for collection, classification, and presentation of data; elements of probability; parametric and non-parametric estimation and hypothesis testing; analysis of variance within the context of specific types of experimental designs; regression modelling and survival analysis. The focus of the course is to develop students' ability to use statistical concepts for decision making and to critically interpret statistical results in popular and research articles
PER 670	Applied Research Design	The purpose of this course is to teach basic research skills and concepts needed to plan, conduct, and analyze data from a research project. Quantitative, qualitative, mixed method approaches to research will be introduced, as well as ethical issues in conducting research. Using the framework of the research project proposal, students will first learn how to identify emerging research topics, state research objectives, derive research questions, and review scientific literature. Then students will learn how to derive variables, state hypotheses, and develop an appropriate study design.

PER 690	Clinical Application in Perfusion I	The Clinical Application in Perfusion I course is designed to provide perfusion students with an intensive opportunity to develop, practice and master the skills required to perform safe extracorporeal circulation procedures. This clinical practice course requires directed hands-on use of equipment and techniques that constitute the cardiopulmonary bypass procedure. Under the direct supervision of a clinical instructor, the students are exposed to increasing levels of responsibility in the clinical conduct of perfusion. As the students' abilities permit, they assume expanding responsibilities with the ultimate goal of functioning independently as a practicing perfusionist. This clinical practice course is taught in the operating room theater with special emphasis on developing technical skills in the extracorporeal procedure itself. Instruction will also include current adjunctive methods in autotransfusion, myocardial preservation techniques, intra-aortic balloon support, and aseptic techniques.
PER 691	Clinical Application in Perfusion II	This component of the perfusion student's clinical experience is designed to provide individuals the knowledge and skills to conduct cardiopulmonary bypass procedures. Students will utilize the aforementioned to perform complex procedures in a safe and effective manner, with the guidance and mentorship of their clinical preceptors.
PER 692	Clinical Application in Perfusion III	This component of the perfusion student's clinical experience is designed to provide individuals the knowledge and skills to conduct cardiopulmonary bypass procedures. Students will utilize the aforementioned to perform complex procedures in a safe and effective manner, with the guidance and mentorship of their clinical preceptors.
PER 693	Clinical Application in Perfusion IV	This component of the perfusion student's clinical experience is designed to provide individuals the knowledge and skills to conduct cardiopulmonary bypass procedures. Students will utilize the aforementioned to perform complex procedures in a safe and effective manner, with the guidance and mentorship of their clinical preceptors.
PER 694	Clinical Application in Perfusion V	This component of the perfusion student's clinical experience is designed to provide individuals the knowledge and skills to conduct cardiopulmonary bypass procedures. Students will utilize the aforementioned to perform complex procedures in a safe and effective manner, with the guidance and mentorship of their clinical preceptors.
PER 700	Perfusion Capstone Project	In this course students will apply knowledge and skills acquired throughout the entire program of study, to develop and conduct a professional and comprehensive research project in the perfusion area. Working with a faculty mentor, students will make connections among concepts, ideas and experiences gained from the didactic and clinical courses and apply them to their research project.
CHEMISTRY		
CHEM 304	Biochemistry	Examines structure and function of biological macromolecules -- polysaccharides, proteins and nucleic acids; lipids; enzymes and metabolism; bioenergetics; control mechanisms; hormones; body fluids; nutrition and biochemical pathology. Prerequisites: BIO111 and CHEM 102
CHEM 504	Biochemistry	Examines structure and function of biological macromolecules -- polysaccharides, proteins and nucleic acids; lipids; enzymes and metabolism; bioenergetics; control mechanisms; hormones; body fluids; nutrition and biochemical pathology. Prerequisites: BIO 111 and CHME 102

CHE 301	Biochemistry	This course provides an overview of the principles of biochemistry related to molecular interactions that govern biological processes in living organisms. Classroom discussions will focus on structure/function relationships of the major classes of biomolecules with an emphasis on proteins, including non-enzymatic and enzymatic protein function, kinetics, and regulation. The major metabolic pathways and the regulation of these pathways will also be examined as well as the thermodynamic principles governing molecular stability, interaction, assembly, and energy flow within the cell. The genetic foundations of biochemistry will be explored to demonstrate information transfer and storage, as well as to elucidate molecular mechanisms underlying human disease.
COMMUNITY & TRAUMA COUNSELING		
CTC 510	Ethics, Standards and Professional Orientation Art Therapy	This course provides students with an understanding of the foundation of the art therapy profession, including history, philosophy, milestones, practitioners, and overview of the major theories in art therapy. Students will examine the roots of art therapy in culture, and the roots of the art therapy profession as a clinical discipline. Students will become familiar with the founders of modern art therapy including those who have developed the profession within specific theoretical approaches. Students will develop understanding of how different theories might manifest within the practice of art therapy.
CTC 512	Ethics, Standards & Prof Orient in Art Therapy	Study addresses professional roles and functions of art therapists and agencies/organizations in which art therapists work, a history of ethical principles, and current and developing issues of ethical practice. Attention will be given to showing art, saving art, online practice, and ethical decision-making models. Discussion includes membership in professional art therapy organizations as well as credentialing and licensure.
CTC 520	Studio and Techniques of Art Therapy	This course will expose students to direct experience of the therapeutic utility and psychological influence of art processes and materials. Art making will be explored relative to assessment techniques, intervention strategies, treatment planning, and building of therapeutic rapport. Study will include systemic applications of art such as the Expressive Therapies Continuum (ETC), the Formal Elements of Art Therapy Scale (FEATS), and the Diagnostic Drawing Series (DDS). Open only to students in the CTC art therapy specialization.
CTC 601	Orientation to the Counseling Profession	Orientation to the Counseling Profession provides students with an understanding of the foundation of the counseling profession, including history, philosophy, and the essential fund of knowledge for counseling practice. Study addresses professional roles and functions of counselors and counseling agencies, ethical practice and issues, and models of practice and administration. Discussion includes membership in professional organizations and credentialing.
CTC 602	Practicum I: Theory Prac Coun	This course provides didactic and experiential learning of advanced counseling theory and practice, with an introduction to theory-driven evidenced-based practices for trauma treatment. Classroom learning and readings provide an in-depth overview of a variety of theoretical approaches underlying individual and group practice in counseling. Discussion will include the basic concepts, interventions, research, practice and issues related to each classic and contemporary approach. Study will address how each approach conceptualizes client presentation and helps the student determine appropriate counseling interventions. Corequisite: CTC 601 or Prerequisite: CTC 601

CTC 603	Human Growth & Development	Human Growth and Development provides an understanding of the development of the individual through the lifespan. Study explores the development of attachment, cognition, emotions, and personality. Discussion includes the perspectives of the bioecological model and factors influencing healthy and unhealthy development, with attention to the effects of trauma causing events and contexts on individuals of all ages.
CTC 604	Psychopathology	This course provides an understanding of the classification, etiology, and treatment of psychopathology. Study includes the examination of symptomatology, clinical presentation, diagnostic criteria, and diagnosis involved with disorders prevalent within counseling contexts.
CTC 605	Foundation of Trauma Counseling	Foundations of Trauma Counseling provides an understanding of the phenomena of trauma and human responses, treatment, and recovery. Discussion includes identifying major types of trauma, effects, assessment, and a survey of clinical interventions. The neurobiology of trauma and responses is explored, with attention to its relevance to understanding response behaviors and treatment.
CTC 606	Social and Cultural Diversity	This course provides an understanding of the social and cultural influences that affect the development, interpersonal relationships, and life experience of diverse client populations. The counseling discipline is committed to the helping professional being prepared to work with individuals with varying backgrounds, including race, ethnicity, culture, gender, sexual orientation, religious preference, and physical disability. The special counseling needs of diverse populations is discussed, including issues relating to different life experiences and needs, treatment approaches, and access to resources.
CTC 607	Advanced Counseling Theory & Practice	This course provides didactic and experiential learning of advanced counseling theory and practice. Classroom learning and readings provide an in-depth overview of a variety of theoretical approaches underlying counseling practice. Discussion will include the basic concepts, interventions, research, practice and issues related to each classic and contemporary approach. Study will address how each approach conceptualizes client presentation and will further help the student to determine appropriate counseling interventions. The experiential portion of this course will be completed in both practicum field placements (as a continuation of CTC 602), and within a small group lab facilitated by a faculty instructor.
CTC 608	Group Work in CTC	This course will provide an understanding of the theory and practice of group counseling. Study explores principles of group dynamics and processes, methods of group interventions and counseling, and characteristics of types of participants, leadership, and facilitation, especially regarding trauma intervention and counseling. The course includes direct experience in which students design a group intervention and practice group facilitation skills.
CTC 609	Counseling Assessment	This course surveys counseling assessments and techniques used in educational, counseling and clinical settings. Study will include selection of appropriate instruments, administration, scoring, and interpretation. Basic statistic concepts will be discussed to provide an understanding of test rationale and construction.
CTC 610	Counseling Research and Evaluation	This course presents a study of basic statistics and research methods used in the social sciences and the implications and application to counseling, with predominant attention to community and trauma counseling. Students will have the opportunity to review current research and literature and evaluate its application to practice.

CTC 611	Career Development	This course provides an understanding of career development related to the counseling process and context. Study explores career development theory, methods of exploration and evaluation, planning and organization strategies, and resources available for career counseling. Discussion will include the examination of interrelationships between work and career, identity, family and social relationships, and psychological health.
CTC 613	Attachment Relations & Family Therapy	This course couples an exploration of attachment theory and research with the study of couples and family therapy. Discussion examines historical and contemporary perspectives on attachment and the relevance for understanding the development of the individual, interpersonal relationships and family dynamics. Major approaches to family therapy are studied, and discussion includes specific application to understanding the influence of trauma on family systems and implications for trauma therapy.
CTC 614	Foundations of Addictive Behaviors	Foundations of Trauma and Addictive Behaviors provides a focused presentation of the foundations of addiction treatment including models of addiction, assessment and screening, co-occurring disorders, treatment processes, and relapse prevention. Discussion examines how the intersection of trauma and developmental disruptions present in clients with addictive disorders, co-occurring disorders, trauma-related issues, and the understanding and practice of key treatment modalities. The course is oriented toward developing a practical counseling framework for utility, while being knowledge rich and flexible for diverse populations.
CTC 615	Relation Trauma to Childhood Development	This course integrates an understanding of typical processes and stages of childhood growth and development with an appreciation for the impact interactions by caregivers can have on the development of healthy/positive physical, intellectual, emotional, social and relational outcomes for infants, toddlers and children. Exploring what can influence positive outcomes opens minds to new awareness that in turn leads to discussions around the potential for negative outcomes, such as those connected with adverse childhood experiences and other forms of trauma. Students will identify and understand some causes of trauma and the impact of trauma on the growth, development and functioning of the brain. Discussion provides an overview of practices that influence healthy growth and development to inspire and inform such practices that can lead to the prevention of adverse experiences in childhood. An additional focus is the preparation for future exploration around the causes and impact of childhood adversity, and appropriate interventions for children and families who have experienced adversity.
CTC 616	Experiential Training Group in CTC	This course will reinforce the learning of CTC 608, Group Work in Community and Trauma Counseling, by allowing students to experience being a process group member. This course provides a deeper understanding of the theory and practice of group counseling as students observe and reflect upon group counseling concepts related to forming groups, establishing norms, the stages of group, group membership, leadership skills, and other special considerations related to process groups.
CTC 619	Art Therapy Assessment	This course gives students an understanding of the history & evolution of assessment and specifically how it is applied in art therapy. Students explore instruments used for clinical assessment in art therapy, including how to administer, score/evaluate, and communicate information gathered. Students will grasp use of tools in treatment planning & advancing the therapeutic relationship and goals.

CTC 620	Advanced Group, Couples and Family Art Therapy Process	This course gives students a comprehensive overview of group theory in art therapy and counseling, including group structures and possible art integration. Students will get a chance to lead actual art therapy groups and engage in every step of the process from conception to execution, processing and documentation. Students will plan groups including structure directives, promote/market, recruit, screen if necessary, facilitate groups at every step, and process group activity and engagement. The primary emphasis will be on the development of group leadership, and attention will be paid to different kinds of groups identified by subject matter or population served.
CTC 630	Enhancing App of Trauma Principle	Enhancing Practical Application of Childhood Trauma Principles This course builds upon previous learning in childhood trauma, and expands upon the practical application of childhood trauma knowledge and skills through a practicum approach. Students engage in observations, planning, implementation and evaluation, and participate in Reflective Processing to enhance their development and competence.
CTC 651	Neurobiology of Trauma	Neurobiology of Trauma provides an understanding of the neurobiological processes involved in trauma experiencing, processing, and post-trauma adaptation. Study includes affective neuroscience, arousal modulation, memory processes involved in trauma experiences, executive functioning, and post-trauma adaptation of these and other areas and processes. Discussion examines application of neuroscience to understanding trauma experiencing and treatment.
CTC 651 CT	Neurobiology of Trauma	Neurobiology of Trauma provides an understanding of the neurobiological processes involved in trauma experiencing, processing, and post-trauma adaptation. Study includes affective neuroscience, arousal modulation, memory processes involved in trauma experiences, executive functioning, and post-trauma adaptation of these and other areas and processes. Discussion examines application of neuroscience to understanding trauma experiencing and treatment.
CTC 652	Childhood Trauma Effects	This course provides an understanding of the environmental factors that contribute to and constitute adverse childhood experiences, and the effects on children's development and subsequent behavior. Discussion will include attachment theory and the influence of attachment on development, historical and contemporary research on adverse childhood experiences and subsequent mental health and illness, and an overview of prevention and intervention, and treatment
CTC 653	Advanced Clinical Intervention in Trauma Treatment I	This course provides a detailed examination of clinical interventions for treating posttraumatic stress disorder. Discussion of the theory behind trauma-informed evidenced-based practices will occur to ensure students have an understanding of the core trauma-informed evidenced based practices used in the field of counseling. Specific study includes trauma-focused cognitive behavioral treatment of adults and children, internal family systems therapy, relational cultural therapy and grief therapies. Discussion examines evidence-based practices and evaluation of therapeutic interventions, including crisis interventions. Psychological First Aid learning will take place through an experiential learning activity.
CTC 654	Knowledge & Skill Required for Comm Disaster	Disaster mental health intervention involves unique clinical skills and knowledge. This course will aid in developing the requisite competencies to enable mental health clinicians to successfully help survivors, rescue workers, and other volunteers in the aftermath of a disaster. Topics include the psychological phases of a community-wide disaster, common patterns of immediate and longterm public response, mental health risks that rescue workers and victims face, assessment of mental health needs, as well as a focus on self-reflection and self care. Course content will align with standards proposed in the Disaster Mental Health Handbook (American Red Cross, 2012).

CTC 655	Advanced Clinical Intervention in Trauma II	This course will provide students with primarily utilize case-based simulation learning as the pedagogy. Specific study includes structural theory of dissociation, dialectical behavior therapy, eye-movement desensitization movement, and somatic experiences interventions. Discussion examines evidence-based practices and evaluation of therapeutic interventions. Students will engage in case-based learning to practice the clinical skills necessary to carry out evidence-based practice components to various traumabased case studies.
CTC 655CT	Advance Clinical Intervention in Trauma Treatment II	This course will provide students with primarily utilize case-based simulation learning as the pedagogy. Specific study includes structural theory of dissociation, dialectical behavior therapy, eye-movement desensitization movement, and somatic experiences interventions. Discussion examines evidence-based practices and evaluation of therapeutic interventions. Students will engage in case-based learning to practice the clinical skills necessary to carry out evidence-based practice components to various traumabased case studies.
CTV 660	Foundations of Child Centered Play	This course provides students with an in-depth grounding in the theory and practice of Child Centered Play Therapy (CCPT). Framed in its historical context, CCPT will be introduced as the foundational model upon which most subsequent play therapy models are based. Students will engage with contemporary CCPT literature and develop competencies in the core skills of structuring, empathic listening, supporting child centered play, and limit setting. This course will call upon students' understanding of client social and cultural contexts, and challenge students to think critically about the implementation of CCPT in a variety of practice settings. Student learning will be facilitated by a combination of lecture, discussion, and skills practice. As part of play therapy sequence, this course will introduce students to knowledge and skills that can be applied across play therapy frameworks.
CTC 661	Historically Significant Approaches: Directive Play Therapy	Building on students' foundational knowledge of play therapy and child trauma, this course introduces several models of directive play therapy. Developed in response to classical, child-centered models, directive approaches feature varying degrees of therapist-initiated interventions. Often, directive interventions are implemented when treatment is time-limited, when clinicians are targeting specific goal areas, or when clients' spontaneous play is inhibited. This course will provide students with base-level knowledge of frameworks of particular significance to the field of play therapy. Students will have several opportunities to engage in hands-on practice of skills that are specific to the models covered in this course and will continue to develop competencies in engaging clients with play therapy materials. Particular attention will be paid to integration of play therapy techniques into brief treatment including in educational and medical settings.
CTC 662	Integrative Seminar: Intersectionality and Play Therapy	The final course in the play therapy sequence, CTC xxx will facilitate students' synthesis of play therapy skills and theoretical models into counseling practice with a particular focus on settings that serve children and families in marginalized communities. Grounded in an intersectional framework for analyzing structural identities, this course will challenge students to engage with issues of power, privilege, and social justice in play therapy case conceptualization and practice. Through a combination of lecture, discussion, and skills practice, students will develop tools to empower children and families through play therapy interventions. This course will also provide students with opportunities to reflect on their professional growth and development as play therapists.

CTC 670	Screening, Assessment and Treatment for Planning for Addiction	Screening, Assessment and Treatment Planning for Addictions provides a foundation for the clinical evaluation for the existence of a substance use disorder as well as any co-occurring disorders, the severity of an existing disorder, an objectified formulation for the determination of an appropriate level of care for treating the disorder and the elements of meaningful planning for ongoing recovery. Discussion examines assessment and diagnosis, co-occurring disorders, trauma related issues, and the development and maintenance of a treatment plan that is specific, meaningful, measurable and relates to the client's presentation of the problem as well as their own stated goals for treatment. The course is oriented toward developing a practical counseling framework for utility, while being knowledge-rich and flexible for diverse populations.
CTC 671	Ethical Treatment and Intervention for Addiction	This course will focus on the counselor as the agent of change for the development and continuation of a meaningful therapeutic relationship with the ultimate goal of client benefit with a move towards sustained recovery. There are key differentials in the develop of a therapeutic relationship that are aligned around issues of power and control. This course will cover various issues that may impact the counselors ability to engage with clients in ethical ways and cover methodologies to create an environment that is conducive to meeting the client's treatment needs and goals. This course will explore the use of clinical self while establishing and maintaining appropriate boundaries thus assuring that the client benefits maximally in the therapeutic exchange while the counselor maintains a healthy psychic distance as a means of assuring objectivity and avoiding compassion fatigue and vicarious trauma.
CTC 672	Neurobiology and Psycho-pharmacology of Addiction	Addiction has presented science with a unique opportunity to study substance use and substance use disorders from the perspective of brain chemistry and, although the current research offers us some hints in this regard, it is still a field in its infancy. This course, The Neurobiology and Psychopharmacology of Addiction will provide students with a foundation for understanding what the current literature offers us in this regard as a means of assisting counselors and therapists with the tools to give understanding to behaviors that, on the surface, might appear irrational. This course will focus on the behavioral influences that disruptions in our clients neurobiology cause. This understanding will assist clinicians in dealing with addictive behavior and guide the treatment process with an end goal of long-term recovery. Additionally, this course will provide students with a working knowledge of psychopharmacology within the field of addictions.
CTC 700	Practicum II: Theory Prac Coun	As a continuation of CTC 602 Practicum I, CTC 700 Practicum II provides further opportunity for clinical practice and supervision at practicum field placements. Students will complete at least 100 hours on site at their practicum placement (across Practicum I and Practicum II), and will continue to develop counseling skills in a community or institutional mental health setting under the direct supervision of a mental health professional. Class discussions will entail group supervision led by University faculty. Class meetings provide students the opportunity for case processing, as well as supervision around various aspects of professional practice. Other discussion topics include an orientation toward a systems perspective, wellness and prevention perspectives, evidence-based practices, theory-driven interventions, and multicultural competence. Prerequisite: CTC 602
CTC 701	Practicum II -Field Experience	As a continuation of CTC 602 Practicum I, CTC 700 Practicum II provides further opportunity for clinical practice and supervision at practicum field placements. Students will complete at least 100 hours on site at their practicum placement (across Practicum I and Practicum II), and will continue to develop counseling skills in a community or institutional mental health setting under the direct supervision of a mental health professional. Class discussions will entail group supervision led by University faculty. Class meetings provide students the opportunity for case processing, as well as supervision around various aspects of professional practice. Other discussion topics include an orientation toward a systems perspective, wellness and prevention perspectives, evidence-based practices, theory-driven interventions, and multicultural competence.

CTC 790	Summer Internship Supervision	As a prelude to CTC 791 Internship I, CTC 790 Internship Supervision provides an opportunity for students to engage in clinical practice at Internship field placements and to receive the necessary faculty supervision during the summer semester. Some training sites require a summer start date, and some students' schedules require more months to meet the established requirements. Students are required to complete at least 600 hours on site at their Internship placement (across Summer Internship Supervision, Internship I and Internship II), and will continue to develop counseling skills in a community or institutional mental health setting under the direct supervision of a mental health professional. Class discussions will entail group supervision led by University faculty. Class meetings provide students the opportunity for case processing, as well as supervision around various aspects of professional practice. Other discussion topics include an orientation toward a systems perspective, wellness and prevention perspectives, evidence-based practices, theory-driven interventions, and multicultural competence.
CTC 791	Art Therapy Internship I	The internship is intended to represent the comprehensive work experience of the professional counselor consistent with the program area of study. Students must complete 600 clock hours over two semesters, begun after successful completion of the practicum, and with 240 clock hours of direct service including experience leading groups. This experience is an opportunity for the student to become familiar with the routine practices and processes of the professional counselor including assessment, record-keeping, supervision, collaboration, referral, in-service trainings and staff meetings. Students will attend periodic group supervision facilitated by a faculty supervisor; these class meetings count toward the clock hours required for the course.
CTC 792	Art Therapy Internship II	The internship is intended to represent the comprehensive work experience of the professional counselor consistent with the program area of study. Students must complete 600 clock hours over two semesters, begun after successful completion of the practicum, and with 240 clock hours of direct service including experience leading groups. This experience is an opportunity for the student to become familiar with the routine practices and processes of the professional counselor including assessment, record-keeping, supervision, collaboration, referral, in-service trainings and staff meetings. Students will attend periodic group supervision facilitated by a faculty supervisor; these class meetings count toward the clock hours required for the course. Prerequisite: CTC 791
CTC 793	Internship Extension in CTC I	The internship is intended to represent the comprehensive work experience of the professional counselor consistent with the program area of study. Students must complete 600 clock hours over two semesters, begun after successful completion of the practicum, and with 240 clock hours of direct service including experience leading groups. This experience is an opportunity for the student to become familiar with the routine practices and processes of the professional counselor including assessment, record-keeping, supervision, collaboration, referral, in-service trainings and staff meetings. Students will attend periodic group supervision facilitated by a faculty supervisor; these class meetings count toward the clock hours required for the course.
CTC 794	Internship Extension in CTC II	The internship is intended to represent the comprehensive work experience of the professional counselor consistent with the program area of study. Students must complete 600 clock hours over two semesters, begun after successful completion of the practicum, and with 240 clock hours of direct service including experience leading groups. This experience is an opportunity for the student to become familiar with the routine practices and processes of the professional counselor including assessment, record-keeping, supervision, collaboration, referral, in-service trainings and staff meetings. Students will attend periodic group supervision facilitated by a faculty supervisor; these class meetings count toward the clock hours required for the course.
COMPUTED TOMOGRAPHY		

RSC 500	CT Physics & Instrumentation	In-depth study of the physical principles and instrumentation in computed tomography. Covers the production of x-rays and their interactions with matter. Provides information on data acquisition and image reconstruction, processing and quality. Addresses CT scanner components and operation, scanning factors and their applications.
RSC 501	Cross Sectional Anatomy I	The study of human anatomy as seen in axial, sagittal and coronal planes. Presents correlations to cadaver slides as well as CT and MR images. Anatomical regions studied include the central nervous system, neck and thorax.
RSC 502	Cross Sec Anatomy II	Continuation of Radiologic Sciences C 401, Cross-Sectional Anatomy I. Anatomical regions studied include the musculoskeletal system, abdomen and pelvis. Prerequisite: Radiologic Sciences C 501
RSC 512	Clin Computed Tomography I	Students participate in the diagnostic process of performing CT imaging examinations at clinical sites. Students image anatomic structures and pathology and record the information needed to provide optimal examinations. Provides intensive, hands-on practice under the supervision of the clinical staff. Evaluation is based on clinical competency in all aspects of CT imaging procedures and patient care.
RSC 513	Clinical CT II	Continuation of Radiologic Sciences C 412, Clinical CT I. Students participate in the diagnostic process of performing CT imaging examinations at clinical sites. Students image anatomic structures and pathology and record the information needed to provide optimal examinations. Provides intensive, hands-on practice under the supervision of the clinical staff. Evaluation is based on clinical competency in all aspects of CT imaging procedures and patient care. Prerequisite: Radiologic Sciences C 512
RSC 514	Clinical CT III	Continuation of Radiologic Sciences C 413, Clinical CT II. Students participate in the diagnostic process of performing CT imaging examinations at clinical sites. Students image anatomic structures and pathology and record the information needed to provide optimal examinations. Provides intensive, hands-on practice under the supervision of the clinical staff. Evaluation is based on clinical competency in all aspects of CT imaging procedures and patient care. Prerequisite: Radiologic Sciences C 513
RSC 531	CT Procedures I	This course provides an introduction to the basic CT imaging protocols for the head & neck, abdomen & pelvis, and musculoskeletal regions of the human body. Course content will include discussion on positioning and scanning protocols, patient preparation, radiographic technique, slice thickness, reconstruction methods, matrix size, field of view, and artifacts. Normal and pathological anatomy will be included.
RSC 532	CT Procedures II	This course provides an introduction to the basic CT imaging protocols for the skeletal/chest regions of the human body and CT interventional/special procedures. Course content will include discussion of the guidelines & contraindication of IV contrast, positioning, & scanning protocols, patient preparation, radiographic technique, slice thickness, reconstruction methods, matrix size, field of view, and artifacts. Normal and pathological anatomy will be included. Also includes illustration of the various special procedures which are offered in the daily workplace of CT. Prerequisite: Radiologic Sciences RSC 531
RSC 533	CT Procedures Simulation Lab I	The CT simulator allows for the instruction of clinical computed tomography procedures in the classroom. Students will acquire clinical experience and confidence with life-like CT operator's console. Students will gain knowledge, scanner operations, imaging procedures, imaging parameters & trade-offs, pressure injector operation, and anatomical positions.

RSC 534	CT Procedures Sim Lab II	Continuation of Radiologic Sciences RSC 433, CT Procedures Simulation Lab I. The CT simulator allows for the instruction of clinical computed tomography procedures in the classroom. Students will acquire clinical experience and confidence with life-like CT operator's console. Students will gain knowledge, scanner operations, imaging procedures, imaging parameters & trade-offs, pressure injector operation, and anatomical positions. Prerequisite: Radiologic Sciences C 533
RSC 573	Computed Tomography Review Seminar	The course provides a review of the fundamental principles of CT system operation, image processing image quality, image artifacts, patient care, and imaging procedures.
CONSTRUCTION MANAGEMENT		
CMGT 600	Construction Estimating & Scheduling	This course focuses upon the planning and scheduling stages of the building process including preconstruction phase, with particular emphasis upon reading construction documents and basic estimating principles applied to small-scale and commercial projects. Techniques for estimating unit quantities and costs of materials, labor and equipment are introduced with given industry applications, building specifications, and computer software. Scheduling principles are introduced with Critical Path Method (CPM) through calculations and software applications. The required software should be installed in students' personal laptops. See CABA Laptop Requirements for details.
CMGT 602	Construction Information Modeling	This course is a BIM-based course to introduce students the aspects of the related BIM software. Students will be expected to develop their skills, including architecture, structure, and mechanical, electrical, plumbing (MEP) components of BIM, using the required software through lectures and self-study. Students will be introduced to estimating and collaboration skills relative to the application of the software to real-world cases. The required software should be installed in students' personal laptops. See CABA Laptop Requirements for details.
CMGT 603	Construction Law: Roles & Responsibilities	Current legal problems associated with the construction industry are investigated from management's perspective by considering the roles assigned to various project participants, reviewing case law, and studying statutory requirements. Students will gain the knowledge to effectively identify and manage the legal and contractual risk associated with construction. This includes understanding current legal and ethical problems associated with the entire building process from preconstruction through project closeout. The class scrutinizes contractual relationships, delivery methods, insurance, bonding, indemnification, dispute resolution, and other risk management tools to better deliver projects on time, within budget, and avoid legal claims.
CMGT 604	Project Finance & Cost Control	This course probes the economics of construction and analyzes project control systems used to effectively manage cost and time. Principles drawn from cognate business fields, specifically accounting, finance, and taxation, are given real-life application relative to construction projects of multiple types and scales. Key budgetary issues are examined in-depth, including financial statements and balance sheets, variance analysis and optimum cash flow methods, as well as efficient cost reporting systems. Additional topics include internal controls, financial analysis and presentation, contractor surety and lending, and fraud, with particular emphasis upon cost-effective methods to procure and deliver construction projects including lump sum, unit price, cost-plus, and design-build.
CMGT 606	Construction Risk Management	This course examines the key concepts, models, codes, tools and techniques used in managing risks within the architecture, construction and engineering industries. The course will focus on planning for the effective implementation of the risk management process, identification and qualitative and quantitative assessment of risks, appropriate strategies to respond to risks, and how to sustain the risk management process throughout the life of a construction project.

CMGT 607	Introduction to Construction Project Management	This foundation course introduces students to the basic construction management concepts and principles as applied to contemporary practice and investigates the intersecting roles of construction manager, architect, and owner. The course will explore the various types of construction along with identifying terms and specific industry vocabulary. Students will learn to read and inspect construction graphics. Topics include Project Delivery Methods (PDMs), construction contracts and specs, CSI master format, and common software applications used in the construction industry.
CMGT 608	Construction Environmental Management	This course examines the key concepts, systems, laws, tools and techniques used in managing environmental risks within the architecture, construction and engineering industries. The course will focus on environmental issues from a construction business management perspective and include analytical techniques, management processes and business strategies that aid successful reconciliation of environmental and economic performance goals for construction operations. Through a combination of real-life cases, readings, lectures, videos, and simulations, class sessions will seek to engage students in discussions aimed at developing systems of corporate environmental management, covering compliance, environmental risk management, pollution prevention, product stewardship, supply chain management, and communication.
CMGT 612	Advanced Construction Project Management	Through detailed case studies drawn from contemporary practice, this course provides in-depth study of the principles and methods critical to the management and integration of the design and construction processes. Planning, scheduling, bidding, professional/client relationship, contractor selection and LEED accreditation are analyzed. Theoretical and practical aspects of project planning are charted, incorporating such essential steps as feasibility studies, estimating project costs, cash flows and cost control through critical path methodologies, risk analysis methods and current techniques for value engineering. Prerequisite: CMGT 600 and CMGT 602 and CMGT 603 and CMGT 604 and CMGT 606
CMGT 614	Materials & Methods of Construction	This course explores a management approach to evaluation and policies involving materials, assemblies and methodologies of general construction. Students are exposed to basic building materials, components, and systems and the appropriate techniques to evaluate their value, constructability, and other characteristics affecting project success. Emphasis is placed on the development of company policies regarding material selection, procurement, handling and assembly. Case studies and ongoing project examples are an integral part of the course.
CMGT 616	Real Estate Development	This lecture course will educate students on all aspects of sustainable development ranging from construction startup to project financing to management of green construction. Students will learn techniques of cost benefit analysis including such aspects as impact of zoning and code ordinance for green projects to understanding tax incentives for such projects. Students will complete case studies and finish the semester with a completed proposal for a sustainable project.
CMGT 618	Heavy Construction Principles & Practice	This course is intended to provide students with an introduction to the principles and practices employed in heavy/civil infrastructure and marine construction. The course content is presented from a practical perspective focusing on the management of heavy/civil construction projects. The course is designed for construction management majors as well as those majoring in related fields and is intended to provide a broad understanding of heavy construction techniques and contracting.
CMGT 791	Construction Management Internship	To ensure competency in the field before graduation, each student must complete 400 hours of professional construction management experience with a firm in the building industry. This requirement may be waived for entering students with equal or greater professional experience. Prerequisite: CMGT 600 and CMGT 603 and CMGT 604

CMGT 901	Master's Project	<p>Construction managers today are part of a team-oriented enterprise, working in collaboration with architects, clients, developers and sub-contractors in the conceptualization and realization of the built environment. This independent study serves as the culminating experience in the program and requires the student to translate the design intentions of the architect and the expectations of the client into sustainable built form. Working in consultation with a committee of academic and professional advisors drawn from both architecture and construction, the student must choose a specific project and produce a comprehensive manual that addresses design concerns, sustainable systems and materials, construction methodologies as well as financial, legal, and safety standards operative in each phase of the construction process. An oral defense, supported by visual documentation realized via relevant digital technologies, will be presented for review and critique by a jury of committee members, faculty and students.</p> <p>Prerequisite:CMGT 612 and SDN 601</p>
COUPLE AND FAMILY THERAPY		
CFT 501	The Theory and Practice of Family Therapy I	<p>This course covers the major early theories of family therapy (Bowenian, structural, strategic, interactional, object-relations, symbolic experiential) and places them in historical perspective. Umbrella concepts related to theories of change, family development, self in context, the nature of therapeutic reality and the therapist's use of self will be addressed. Issues of gender, power, sexual orientation and ethnicity in the clinical context will be explored, along with application of the theories to specific clinical problems.</p>
CFT 502	The Theory and Practice of Family Therapy II	<p>This course covers major recent developments in the field of family therapy including social constructionism, post-modernism, the feminist critique of family therapy and the emphasis on language based systems. Newer theories such as narrative therapy, solution focused therapy, feminist therapy, paradoxical therapy and collaborative language systems will be reviewed. Clinical applications of these theories will be addressed along with issues of diversity, power, gender and sexual orientation class and ethnicity.</p>
CFT 503	Foundations of Systemic Practice	<p>This course will introduce students to the theoretical and epistemological ideas basic to the field of couple and family therapy. It will examine how concepts from general systems theory, cybernetics and communication theory inform clinical practice. It will also introduce students to basic skills and concepts necessary to initiate therapy with families and couples such as conducting the first interview, framing the presenting problem, developing an initial assessment and treatment contract.</p>
CFT 505	Life Span Development from a Systemic Perspective	<p>This course explores the dynamic interaction of the family life cycle and child and adult development. It orients the student to the concept of family life cycle changes and their impact on individual, couple, and family functioning. The course also familiarizes students to the effect of issues of race, gender, ethnicity, sexual orientation, and culture on the family life cycle.</p>
CFT 506	Practicum I	<p>Practicum I is a clinical experience during which students develop foundational clinical skills, professional attitudes and ethical awareness in systems oriented individual, couple and family therapy. Focus will be on forming the therapeutic system, contracting, couple and family assessment, clinical record keeping, the therapeutic alliance and the initial stages of couple and family therapy. Practica will be conducted at various clinical sites and require students to provide their own transportation.</p>
CFT 507	Practicum II	<p>Practicum II is a continuation of Practicum I.</p>
CFT 508	Practicum III	<p>Practicum III is a continuation of Practicum II.</p>

CFT 509	Professional, Ethical, and Legal issues in Couple and Family Therapy	This course introduces students to the professional, ethical and legal issues common to a systems-oriented therapy practice. The impact of the therapist's personal values and ideological convictions on his/her professional practice will be examined. In addition a thorough review of the AAMFT Code of Ethics and the steps toward clinical membership in the AAMFT, as well as state licensure as a marriage and family therapist will be provided.
CFT 511	Introduction to Sex Therapy: Concepts in Human Sexuality	This course explores essential concepts of sexuality by examining the basic theory, research and practice regarding sexual issues for which clients seek understanding and treatment. Topics include the history of sexology, sexual and reproductive anatomy and physiology, sexually transmitted infections and safer sex practices, sexual trauma, sexual compulsive behaviors, sexual orientation, atypical sexual behaviors, gender, religion, chronic illness, social-cultural issues and sexual feelings in clinical practice. Students will explore personal attitudes, values and emotions as they relate to course material. This course will also include a mandatory one day Sexual Attitude/Values training experience.
CFT 512	Live Supervision I	This is an advanced clinical seminar that allows students to experience supervisory input while actually conducting therapy with the use of a one-way mirror. Students also will function as part of a clinical team observing, hypothesizing and developing interventions behind the mirror. The history, theory and rules of live supervision will be discussed. The use of self in the process of change and person of the therapist issues will be examined. This seminar will focus on the early phases of therapy.
CFT 513	Systemic/ Relational Assessment & Mental Health Diagnosis and Treatment	This course familiarizes the student with the major areas of psychopathology from a biopsychosocial perspective. It will review the DSM-IV and the emerging DSM-V classification of mental disorders as a basis for a more complete assessment, understanding and treatment of couples and families. The reciprocal impact of individual psychopathology and couple and family functioning will be examined along with issues of cultural context and deviancy, power and class. This course explores direct and indirect and both qualitative and quantitative methods of assessment to give students an understanding of the relationship between a thorough assessment and direct clinical intervention. Self-report and observational approaches are considered. The value of ongoing assessment throughout the course of therapy is highlighted. The relevance of age, race, culture and gender to the assessment process is reviewed. Students will integrate assessment into practice through experiential exercises, role-plays, case presentations, discussions, and videotapes.
CFT 514	Theory & Practice of Couple Therapy	This course covers the history and practice of couple therapy. Major theoretical models of couple therapy will be reviewed including Bowenian, Structural, Object Relations, Cognitive-Behavioral, Strategic, Psychodynamic, Emotionally Focused and Contextual. Focus will be on the fundamentals of working therapeutically with couples including couples dynamics, intervention strategies and methods of facilitating growth and change. Particular emphasis will be placed on distinguishing content and process in couple therapy and the role of the therapist in creating a therapeutic context. Issues of therapeutic balance, power, reactivity, gender, privilege and ethnicity will be explored along with application theoretical models to specific clinical problems such as affairs, communication, intimacy issues, chronic conflict and jealousy.
CFT 601	Implications of Diversity for Clinical Practice	This course will help students develop awareness and sensitivity to diversity issues as they influence assessment and treatment of individuals, couples and families within a socio-cultural context. Students will develop an understanding of discrimination and prejudice in areas of age, culture, ethnicity, gender, race, health/ability, spirituality, sexual orientation and socioeconomic status. Students will be encouraged to explore biases, stereotypes and their own values. This course will highlight the strengths of diverse family structures and explore how to use them as therapeutic resources.

CFT 602	Research in Couple and Family Therapy	This course will prepare the student to evaluate research findings and formulate research questions and methods of exploration in the field of couple and family therapy. The role of theory, research design, and the use of qualitative and quantitative methods, data collection and data analysis will be emphasized. The role of research in advancing systemic theory and practice will be addressed. Students will be helped to develop a preliminary draft of their master's project in the second half of the course.
CFT 603	Advanced Sex Therapy Training I	This course builds on the introductory course and offers advanced understanding of assessment, diagnosis and treatment models for sex therapy practitioners. Students will learn and engage in the practice of these therapeutic modalities throughout the course. Specific attention will be paid to learning the techniques of sex-related assessment, diagnosis and treatment of the psychosexual disorders as described in the current edition of the DSM. Theory and methods of both psychological and medical interventions will be explored. This course will include a mandatory one day Advanced Sexual Attitude/Values training experience.
CFT 604	Advanced Sex Therapy Training II	This course is an extension of ASTT-I. It will help students gain greater insight into the field of sex therapy as well as practice the skills learned in the previous courses. The course will include peer group supervision, discussion of current issues in human sexuality, videotape case presentation of the student's clinical work. Prerequisite: CFT 603
CFT 605	Issues of Violence and Abuse in the Family from a Systems Perspective	This course will examine the characteristics and impact of intrafamilial violence and abuse on adults and children. It will focus on the nature and scope of this epidemic problem and review key contributing factors. Issues of gender, power and socioeconomic status will be examined. Sexual, physical and emotional abuse of adults and children will be discussed. Systems oriented treatment for all family members approaches will be reviewed with an emphasis on accurate assessment and the development of appropriate interventions.
CFT 606	Addictions in a Multisystemic Context	See program for more details.
CFT 607	Practicum IV	Practicum IV is an advanced clinical practicum during which students will focus on the integration of clinical theory, assessment techniques, intervention strategies, dealing with resistance, the therapeutic alliance, use of self as an instrument of change, recontracting, ethical issues, sex therapy techniques and termination issues. Practica are conducted at various clinical sites and require students to provide their own transportation.
CFT 608	Practicum V	Practicum V is a continuation of Practicum IV.
CFT 609	Practicum VI	Practicum VI is a continuation of Practicum V.
CFT 610	Trauma Interventions in a Contemporary Context	See program for more details.
CFT 611	Medical Family Therapy	This course will examine the complex interactions between physical illness and family functioning and the clinical interventions that can be utilized in these situations. A review of the empirical findings and theoretical concepts that form the basis of this emerging field will be undertaken. A biopsychosocial framework will be developed for understanding and treating a variety of common clinical problems such as psychosomatic symptoms, coping with chronic illness and chronic pain, grief and end of life issues. Collaboration with other health care providers will be discussed.

CFT 612	Families in Transition	This course will focus on the differential impact of major life cycle transitions, specifically, separation, divorce and remarriage on family members. An overview of the issues and challenges that these families face within a broader cultural context will be discussed. The dynamics of family dissolution and reorganization will be addressed, along with specific intervention strategies. The course will cover helping families through the separation process, co-parenting counseling, understanding issues relating to loss, the effects of conflict on children's adjustment, and blended family and step-parenting dynamics, as well as, the impact of the legal system on the family and therapeutic system.
CFT 613	Master's Project	The master's project is the culmination of the student's scholarly requirements. Students will develop a scholarly paper demonstrating a mastery of clinical theory in the field of couple and family therapy and the ability to apply that theory in a clinical situation under the direction of a faculty advisor. The project must demonstrate the student's mastery of the academic area chosen and attempt to integrate his or her clinical interests within a scientific framework. The students will be expected to produce a written work product that meets the academic requirements described below and to present his or her work to the program faculty and his or her peers in a supportive learning environment.
CYTOTECHNOLOGY and CELL SCIENCE		
CVT 501	Principles of Cell Analysis	Cell identification methods and morphologic criteria used in the evaluation of cytology specimens. Emphasis on manual and automated microscopy for detection and interpretation of basic cell types and changes found in conventional and liquid-based cytology specimens. Lecture and laboratory.
CVT 510	Cytopreparatory Techniques and Surgical Pathology	Technical preparation of tissue specimens for microscopic examination, including gross dissection of tissues, paraffin processing, sectioning and routine and special staining. Microscopic analysis of the tissue specimens and preparation of a histopathologic report.
CVT 511	Cytopathology I	Study of the anatomy, physiology, cytology and pathophysiology of the female genital tract and corresponding cellular manifestations which provide diagnostic information. Lecture. Prerequisite: CYT 301/501
CVT 512	Cytopathology I Laboratory	Integration of didactic information pertaining to the female genital tract, with application of diagnostic criteria to develop practical analytical expertise. Students interpret laboratory data, explain the significance of the data to a patient's condition and offer diagnoses and/or recommendations for further testing. Laboratory sessions include independent microscopy following by the evaluation of the students' diagnosis/readouts via one-on-one and multi-head sessions. Prerequisite: CYT 301/501
CVT 515	Cytopathology II	Study of the anatomy, physiology, cytology and pathophysiology of the respiratory tract (including lung FNA's), fine needle aspiration cytology of mediastinum, breast, liver, pancreas and salivary glands, kidney and adrenals, with application of cytohistologic and molecular diagnostic criteria to develop practical analytical expertise. Students interpret laboratory data, explain the significance of the data to a patient's condition and offer diagnoses and/or recommendations for further testing. Lecture & Laboratory. Prerequisite: CYT 311/511, 312/512
CVT 517	Cytopathology III	Study of the anatomy, physiology, cytology and pathophysiology of the gastrointestinal tract (brushes), urinary tract, effusions including CSF, fine needle aspiration cytology of thyroid, lymph nodes, bone and soft tissue, with application of cytohistologic and molecular diagnostic criteria to develop practical analytical expertise. Students interpret laboratory data, explain the significance of the data to a patient's condition and offer diagnoses and/or recommendations for further testing. Lecture and Laboratory Prerequisite: CYT 315/515

CVT 525	Cellular, Molecular, and Immuno Diagnostics	Review, microscopic examination and comprehensive analysis of selected cases in gynecologic, nongynecologic and fine needle aspiration cytology. Special emphasis on differential diagnosis, clinical correlations, decision-making algorithms and diagnostic pitfalls. Differential diagnostic panels based on molecular and immunologic ancillary technologies are discussed with stress on the laboratory diagnostic triaging and tumor markers. Course is provided based on interactive learning modules.
CVT 575	Cytotechnology Seminar	This course is designed to allow students to evaluate their readiness for the CT BOC examination, promote proficiency in entry-level competencies and gain competence in computer-guided screening. Students explore personal and professional development related to the transition into the workplace. Topics include certification preparedness (all disciplines of cytotechnology practice), resume development and training in computer-guided screening technology. Review topics are covered through presentations, journal articles, active learning activities, case studies, review questions, self-assessments, examinations, and resume development and critique. This course is the pre-requisite course for CT 816 Comprehensive Examination.
CVT 812, 13,14,15	Cytotechnology Practica I, II, III, IV	Graduate clinical internships in a variety of cytopathology laboratories. Students participate in all phases of diagnostic service work and laboratory functions (preanalytical, analytical, postanalytical) that may include continuing education activities, adjunct diagnostic technologies and seminar attendance. Prerequisite: Completion of pre-practicum cytotechnology and core curriculum coursework.
CVT 813	Cytotechnology Practica II	Graduate clinical internships in a variety of cytopathology laboratories. Students participate in all phases of diagnostic service work and laboratory functions (preanalytical, analytical, postanalytical) that may include continuing education activities, adjunct diagnostic technologies and seminar attendance. Prerequisite: Completion of pre-practicum cytotechnology and core curriculum coursework.
CVT 814	Cytotechnology Practica III	Graduate clinical internships in a variety of cytopathology laboratories. Students participate in all phases of diagnostic service work and laboratory functions (preanalytical, analytical, postanalytical) that may include continuing education activities, adjunct diagnostic technologies and seminar attendance. Prerequisite: Completion of pre-practicum cytotechnology and core curriculum coursework.
CVT 815	Cytotechnology Practica IV	Graduate clinical internships in a variety of cytopathology laboratories. Students participate in all phases of diagnostic service work and laboratory functions (preanalytical, analytical, postanalytical) that may include continuing education activities, adjunct diagnostic technologies and seminar attendance. Prerequisite: Completion of pre-practicum cytotechnology and core curriculum coursework.
CVT 816	Comprehensive Examination	Background readings, comprehensive review and self-administered quizzes/exams in the discipline-specific body of knowledge and scope of practice necessary to prepare for national certification examination(s). Web-based course. Prerequisite: Completion of at least two practicum courses.
EMERGENCY AND DISASTER MANAGEMENT		

EDM 610	Foundations in Emergency Management	This course provides participants with a general overview of disaster events and covers the key components of disaster prevention, risk assessment and disaster management including: types of disasters, phases of disasters (preparedness, mitigation, response, and recovery), a brief history of disaster management in the US, agencies involved in disaster situations, public service disruptions and actions, the FEMA Whole Community concept, resilience, media relations, incident command systems and mass casualty triage. We focus on the practical application of management principles including the development of key tools including the emergency operations plan and the THIRA.
EDM 612	Foundations of Homeland Security and Defense	The US has embraced the homeland security monolith having neither fully understood or tamed all that it encompasses. This challenging course provides a broad overview of homeland security and homeland defense as undertaken in the United States since 9/11. The goal is to provide the generally accepted body of knowledge required of the homeland security professional. The course focuses on four areas: the enemy, animosity and potential outcomes of threats posed; the policies and procedures enacted since 9/11; federal, state and local governmental roles; and legal issues critical to the conduct of homeland security and defense activities by the military including the National Guard. The student will gain an understanding in asymmetric thinking, develop an appreciation for the growing body of literature in the discipline of homeland security, and have the opportunity to examine a key issue in depth through a term research paper.
EDM 613	International and Humanitarian Disaster Management	International and humanitarian disaster management has steadily evolved over decades. The increased emphasis on global disaster preparedness from both governmental and private sectors has widespread application across all borders. Through the exploration of disaster models, public health principles, economic, social and political elements, students will explore the application of the disaster cycle.
EDM 615	Hazardous Materials & Industrial Safety	This course provides an overview of the major hazardous materials commonly encountered and their effects on humans and wildlife. Industrial waste, pollution, nuclear waste, hazardous waste transportation and the management of hazardous material accidents are all covered.
EDM 617	Disaster Mapping	This course will provide students with an introduction into geographic information systems by infusing it into emergency management. The class will focus on the 3 major elements: 1) Fundamentals of GIS, 2) Knowledge of GIS software, and the 3) Understanding of the spatiality in emergency management situations.
EDM 619	Natural Disasters	The purpose of this course is to develop an understanding of the various types of natural disasters which plague the world. The student will study the forces of nature which cause these events to occur, the population effects of the event itself and the dynamic nature by which the event spawns further cataclysmic change in our environment.
EDM 623	Weapons of Mass Destruction	This course introduces students to the various types of biologic, chemical and nuclear/radiologic weapons, along with the clinical manifestations and management of exposure to these. Decontamination and institutional procedures for weapons of mass destruction incident management are also covered.
EDM 624	Organizational Risk and Crisis Management	This course examines key concepts in the understanding and management of risk in an organizational environment. Aspects of risk evolution, tools and techniques, project vulnerabilities, uncertainty, modeling and risk software are included.

EDM 625	Business and Planning for Crisis Continuity	The course explores the issues in maintaining a business in the midst of crisis and the disruption of resources. It includes planning for, responding to, and recovering from an internal or external crisis in the organization.
EDM 626	Organizational Recovery and Planning	This course discusses business and organizational implications of the disaster recovery lessons taught by 9/11, the California energy crisis, the anthrax scare and other related disastrous events as they relate to emergency decision making and planning. Special emphasis is directed toward infrastructure and IT/IS implications of process continuation.
EDM 627	Principles of Terrorism	The types of terrorism, along with the social, political and psychological motivations and ramifications of terrorism are the focus of this course. Threat risk assessment and prevention strategies are also components.
EDM 631	Organizational Management and Communication in Disasters	This course introduces students to theories of organizational dynamics and management as it pertains to crisis and disaster situations. The course also explores communication within the organization, with external agencies, and with the public and media during and after disaster events.
EDM 635	Psychological Aspects of Disasters	This course explores the psychological sequelae of disasters and traumatic events including acute stress disorder and posttraumatic stress disorder. The clinical presentation, assessment and management of these disorders are discussed. Clinical interventions such as post-event debriefing, short-term counseling and mental health referral in disaster situations are also covered. This course includes an intensive on-campus experience.
EDM 639	Principles of Disaster Exercises & Drills	Through learning and applying a common approach to disaster exercise design development, conduct and evaluation, students will gain mastery of the process and tools for producing effective disaster exercises. Students will learn about the National Incident Management System as it is used in Emergency Operations or Emergency Coordination Centers during disaster response. Additionally, students will explore the evolution and supporting resources for disaster exercise development. This course includes an intensive on-campus experience - EDM 700. Recommendation to take EDM 635 and EDM 639 together due to the on-campus week activities. Prerequisite: EDM 610
EDM 640	Logistic Management for Disasters	By applying logistics, financial and supply chain principles to actual disaster and humanitarian events during the last 25 years, students will focus on what preparedness actions are necessary to ensure the adequacy of supplies and goods to citizens and emergency personnel during a disaster event. The basic principles supply chain management for healthcare will also be reviewed. An examination of both US and international incidents will focus on planning and response. Further, we will discuss the roles of governments in delivery of logistics assistance, and the functions of Non-Governmental Organizations (NGO) in these processes. Prerequisite: EDM 610
EDM 643	Public Health Implications of Disasters	The purpose of this course is to develop an understanding of the concepts of public health as they relate to disaster management. The student will apply Noji's five phases of a disaster to actual disaster events during the last 25 years and will focus especially on what preparedness actions are necessary to safeguard the health of citizens and emergency personnel during a disaster event. Public health issues in disaster management that are covered include water and food supply disruption and contamination, waste disposal, environmental pollution and infectious disease outbreaks. The basic principles of epidemiology and health surveillance are also reviewed.

EDM 648	Emergency Preparedness for Special Needs Population	The term “special needs” is widely used within the disaster services and the emergency management world. It generally refers to an extremely broad group of people with physical disabilities, people with serious mental illness, pregnant women, children, and the elderly. These groups represent a large and complex variety of concerns and challenges. Many of these groups have little in common beyond the fact that they are often left out of programs, services, and emergency planning. This course will introduce students to planning, responding, mitigating, and recovering from a disaster as it pertains to the special needs population. This will include specific functional roles, resource identification and response of personnel involved in disaster management. Students will be presented with problem based learning assignments and based on the assigned readings, research, and personal experiences, they will be able to analyze and apply the theories and principals pertaining to the response and recovery of anevent to these special populations.
EDM 649	Healthcare Emergency Management	Healthcare emergency management has steadily evolved over decades but at an increased rate since September 11, 2001. The increased emphasis on disaster preparedness from both the public as well as regulatory agencies now requires a level of knowledge beyond the technical level. This course is designed to provide a foundation in hospital emergency preparedness.
EDM 651	Applied Research Methods & Statistics	Basic statistics and research methods used in the medical and social sciences are covered in this course. Students will have the opportunity to review current medical research and evaluate it with regard to its application to practice
EDM 653	Clinical Disaster Medicine	This course is designed to expose the student to the clinical aspects of disaster medicine by encouraging exploration of the roles of healthcare providers in disasters, the study of clinical situations that occur during disasters, analysis of public, occupational, and environmental health issues, and applying research and epidemiology concepts.
EDM 700	EDM Conference week	This course will provide students with the opportunity to practice and refine the basic emergency management skills learned in the foundational courses. The multiday conference week requires full participation and engagement as you demonstrate your grasp of concepts. This experience must be registered for in conjunction with EDM 639 and is only offered in the Summer term.
EDM 755	Capstone Experience in Disaster Medicine and Management	In this capstone experience students will complete either an: original research project; an original disaster plan; a systematic review paper on a disaster-related topic with thorough literature search, analysis and compilation; or an internship with disaster plan. All of these will involve a thorough literature search, an analysis of the current research, integration of multiple facets of disaster medicine and management and completion of a substantial written product. Prerequisites: EDM610 and EDM 631 and EDM 651
DMM 791	Internship in Disaster Medicine and Management	This experience is an optional internship in disaster medicine or management at an agency involved in disaster preparedness or response. This may include international experiences when available. Prerequisites: EDM 610 and EDM 631
EDM 797	Special Topics in Disaster Medicine and Management	This course provides an opportunity to explore topics in disaster medicine and management not developed in other courses. Examples include recent complex humanitarian emergencies, disasters, or catastrophes, new practice technology, essential health policy changes, new research findings, and other cutting edge materials. Students may take this course more than once as the topics differ each time it is offered.
ENGINEERING		

ENGR 600	Bioanalytical Regulatory/ Quality Principles	This master level course will introduce the students to the concepts and requirements for global pharmaceutical quality and regulatory compliance associated with approval of a new biologic and biosimilar. The FDA's concepts of Quality by Design (QBD), Process Analytical Technology (PAT) and Critical Quality Attributes (CQAs) (product and process) will be through case studies and examples to provide the foundation for ensuring that product quality, safety and efficacy are built into process during design and not introduced as an afterthought. This introductory course provides the basic principles of QBD, PAT and CQAs using case studies and definition and terms relevant to understanding how a modern biopharmaceutical products are developed and marketed in a highly regulated environment.
ENGR 601	Intro Upstream Unit Operations	This advanced level course is focused on the application of principles of cell culture operations in fed-batch and perfusion bioreactors from bench scale to production scale. Students will be introduced to design, scale up and scale down approaches through case studies, hands-on laboratory studies, seminars, individual and group projects and formal class lectures. Examples will include cell culture operations used to produce biopharmaceutical medicine including peptides, proteins and monoclonal antibodies for variety of diseases including cancers, diabetes, rheumatoid arthritis, scoliosis, to name but a few.
ENGR 602	Intro Downstream Unit Operations	This master level course introduces students to the first principles and application of preparative chromatography for downstream purification as well as other key unit operations including tangential flow filtration (TFF) for product formulation and concentration. Students will be introduced to design, scale up and scale down approaches through case studies, hands-on laboratory studies, seminars, individual and group projects and formal class lectures. Examples will include industrial operations used to produce biopharmaceutical medicine including peptides, proteins and monoclonal antibodies for variety of diseases including cancers, diabetes, rheumatoid arthritis, scoliosis, to name but a few.
ENGR 603	Applied Math & Statistics Methods in Biology	This master level course is designed to give participants the basic knowledge and confidence in the practical design and realistic analysis of data within the contexts of bioprocess research and development and Biomanufacturing. Students will gain basic experience in displaying, summarizing, analyzing and interpreting bioprocessing data using standard mathematical and statistical methods. At the end of this course students will understand the statistical concepts of bias, variability, and sampling distributions, be able to select the appropriate statistical method for a given data set, evaluate the quality of data collected from observational and experimental studies, design simple studies, use statistical computer software to explore and analyze data, understand statistical language as used in bioprocess development and biomanufacturing, and lastly, interpret statistical results and communicate them to other scientists and engineers.
ENGR 604	Biopharm Process Operations	This masters level hands-on course provides practical firsthand experience with many of the techniques and principles taught in the complimentary lecture courses in upstream and downstream operations. The experiments are designed to teach students a broad understanding of key unit operations and the challenges of working in a Good Manufacturing Practice-like (GMP-like) environment. The focus of the course will include technical aspects, documentation, batch record keeping and reporting of data. Major operations will include downstream bio-separation techniques, including chromatography, tangential flow and depth filtration, as well as upstream operations including seeding and bioreactor utilization. As a result, students will gain a thorough understanding of unit operations performed in a GMP setting.

ENGR 605	Quality by Design, Process Selection and Optimization	<p>This master level course introduces students to the concepts of quality-by-design (QbD) and its application specifically to biopharma and biomanufacturing through contextual examples, case studies, seminars, lecture and team work projects. As the attributes of biopharmaceutical and biologic products are poorly understood early in process design and development, often times these products are defined by their manufacturing processes which are often not fully characterized in first generation manufacturing. QbD is a systematic scientific, risk-based, holistic and proactive approach to biopharmaceutical development. This approach to biopharmaceutical development adopts a deliberate design effort from product conception through commercialization with a full understanding of how product critical quality attributes (CQAs) and process parameters impact safety, efficacy, and performance.</p>
ENGR 606	Process Characterization and Validation	<p>This master level course introduces students to the concepts of tech transfer, process characterization and risk-based validation specifically in the contexts of manufacturing of biopharmaceuticals and biologics. The course will be delivered through examples, case studies seminars and class lectures and team work projects. Process Characterization and process validation are major components within FDA's regulatory expectation for product approval. This course is intended to introduce the students to regulatory guidelines, recommended techniques and expectations through good practice and well established tools developed over the past two decades by regulatory and bio manufacturers.</p>
ENGR 607	Business and Entrepreneurship in Life Sciences	<p>This master level course is designed to train students in entrepreneurial leadership in biopharmaceutical- based industries. The course consists of two elements. The first element focuses on the practical application of preparing a business plan for new ventures. This component centers on bioprocessing of new products and their potential translation into real-world outcomes through a viable business. The second element is designed to introduce the students to the key aspects of implementing the objectives of a business plan once appropriate funding has been obtained. Legacy and next generation biologics including stem cells, gene therapy, tissue engineering and regenerative medicine are proving exceptionally efficacious. As a result, the market is growing and new companies are being created at incredibly fast rates. In this course, students will be given basic understanding of the challenges and opportunities in developing a new company for the creation of biopharmaceutical grade products based on these emerging discoveries.</p>

ENGR 608	Capstone Design Project	<p>The Capstone course may be taken as a team design project or alternatively, and where appropriate as an independent bioprocess research and development (BR&D) project. In both cases the course is thesis-based and the focus will be projects in biopharmaceutical processing and Biomanufacturing operations. Students taking the design project will work under supervision in small teams to design, for example, a complete biomanufacturing plant capable of producing commercial quantities of an API or DP. Each team will work on a separate and specific project leading to a process design. Typical examples include manufacturing of insulin, human growth hormone, tissue plasminogen activator, monoclonal antibodies for cancers, and autoimmune diseases. Students will evaluate potential commercial opportunities and manufacturing options, selecting the expression system, designing the upstream operations, from vial to production bioreactor, harvesting and downstream purification sequence of operations. A detailed literature survey will be included to understand the best industry practices. Team discussion and consultation with subject matter experts within JIB and with external companies will then be followed leading to specification of the purity profile for the product. This is then followed by preparation of detailed engineering flow sheet that includes each unit operation. Selection and sizing of each equipment for each unit operation will then be carried to meet a specified annual demand for the product. Finally an economic evaluation of the process will be carried out to evaluate the cost of good and potential pricing of the product. The final design will be evaluated and interpreted using available simulation and modelling techniques. A group report and individual report will be presented by each student in the team. A student or small group of students taking the BR&D option will work with one or more faculty members on a project which may include a specific unit operation or an integration of operations. Typical projects include, but are not limited to, continuous bioprocessing, cell line development and optimization, media optimization, scale-down model development, CFD modeling of bioprocess operations. Where possible and to add value, preference will be given to projects are industry sponsored. Students are required to report their results regularly (weekly or biweekly) to their supervisors. Students on both tracks (Design and BR&D) are required to submit and defend their final report, create and present a poster based on the results of their work and give a public (open) power-point presentation. If and when required, for example in the case of an industry sponsored projects, students will be required to obtain the necessary approval form their sponsoring companies for open presentations.</p>
ENGR 609	Bioprocess Engineering for Scientists	<p>This master level course introduces students to the basic underlying transport processes of momentum, mass and heat transfer pertinent to biopharmaceutical process development. The course will demonstrate the power of mathematical techniques, modeling and statistical methods to resolve practical issues in a biomanufacturing setting. The course is experiential and includes project work, seminars, workshops and formal class room presentations and discussions to illustrate concepts.</p>
ENGR 610	Basic Life Sciences for Engineers	<p>This master level course introduces students with first degrees in engineering and related disciplines to underlying principles and applications of key concepts in microbiology, biochemistry, and biology to highlight the importance of cells, genes and proteins as the basis of disease and as therapeutics. The course will cover basic recombinant DNA technology as used in the production of therapeutic proteins and monoclonal antibodies. The course will cover basic properties of amino acids, peptides, proteins and monoclonal antibodies, structure-function of proteins and DNA, and cellular reactions involved in cell growth and metabolism, translation, transcription, and replication. Topics will cover different expression systems, basic design of vectors, cell transfection and protein expression and associated analytical methods and techniques. The course is experiential and includes project work, seminars, workshops and formal class room presentations and discussions and group work to illustrate concepts.</p>

ENGR 611	Principles of Biopharmaceutical Process Engineering	An introduction to the basic methods and techniques used in industry for the manufacture of biopharmaceuticals and biologics. The intent is to introduce the students to the challenges as well as opportunities in bioprocess development of a new biologic with the focus specifically in this course on developing a process flow diagram for a molecule in early phase development and using quality-by-design and risk-based management to optimize it for late phase clinical and launch.
ENGR 612	Emerging Therapeutics	This course focuses on the on-going development and history of advanced bio-therapeutics ranging from recombinant antigen-based vaccines to genetic-based vaccines, and from protein replacement bio-therapeutics to next generation immuno-therapeutics based on cell and gene therapy. Through specific examples, and case studies this course follows recent and on-going product and process developments in emerging therapeutics to help understand technical and economic challenges associated with the launch of new products. The course will also consider new collaborative opportunities to mitigate these challenges, while increasing the chances of success, including new partnerships (academic-industry-government agencies) aimed at spreading cost, reducing risk, and increasing efficiency
ENGR 613	Vector and Cell Line Design	This course focuses on providing the foundational education for students who wish to focus their careers in cell line engineering and development, cloning operations, and construct / vector design. Individuals attending this course gain fundamental knowledge of the latest, most advanced cloning strategies vital to cell line development for protein and vaccine production, including verification and sequence analysis of the gene and protein of interest, codon optimization, vector construction, and clone / host cell selection and engineering.
ENGR 614	Vaccine Formulation	Several vaccine formulation technologies are available, including liquid, lyophilized, oil-in-water emulsion, water-in-oil emulsion, liposomal and nanoparticle, all of which may include adjuvants. If selected and formulated correctly adjuvants can dramatically enhance the effectiveness of the active pharmaceutical ingredient (API), causing a reduction in dose required to elicit an immune response. Adjuvants are often used for their dose-sparing potential, but the development of adjuvants and their use in vaccine formulation remains more of an art than a science. This course focuses on the development of formulation strategies for therapeutic and preventive vaccines and is crucial to the understanding of advanced vaccine manufacturing and development.
ENGR 615	Biologics and Biosimilars: A Regulatory Overview	In order to design and produce biologics and biosimilars, in-depth knowledge of the regulatory requirements and underlying biological principles related to molecule identity and production are required. This course addresses these issues through an exploration of key concepts in microbiology, biochemistry and biology, with an emphasis on their importance to the verification of the identity of a therapeutic molecule and the various regulations required to do so. To highlight the importance of the production process, recombinant DNA technology with an emphasis on the basic design of vectors, cell transfection, protein expression and associated analytical methods and techniques will also be addressed.
ENGR 616	Chemistry, Manufacturing and Control (CMC) and Pharmaceutical Good Manufacturing Practices	This course provides participants with the knowledge and expertise required to utilize CMC and GMP to design GMP analytical packages to demonstrate a consistent and reliable manufacturing process. These concepts will also be applied to formulation development followed by clinical trial supply manufacturing that is both fully GMP compliant and monitors all areas of risk to ensure product quality.

ENGR 617	Quality Systems for Regulatory Compliance	A comprehensive understanding of the underlying principles and applications of key concepts in pharmaceutical quality systems is paramount to the production of safe and efficacious therapeutics. This course is designed to train students on the utilization of Quality Management System (QMS) in a GMP environment and the maintenance of pharmaceutical quality. The course will focus on the internationally harmonized guidance ICH Q 10, with an emphasis on quality tools and techniques used in a GMP pharmaceutical environment to ensure the quality of the pharmaceutical product with a focus on patient safety.
ENGR 618	Technical and Regulatory Aspects of Analytical Method Validation	A fundamental biopharmaceutical QC requirement for both GMP inspection of laboratories and product registration, is the analytical test method validation. This course is designed to provide students with an in-depth understanding of the technical and regulatory aspects of the analytical methods utilized to characterize drug-related samples to ensure that the results are trustworthy, as the analytical methods may be utilized as the basis for decisions related to patient safety.
ENGR 619	Biopharmaceuticals and Biologics: Regulatory and Quality	This course is part of the Innovation MBA (iMBA) concentration in Biopharmaceutical Commercialization and is intended for students that are new to the biopharmaceutical and biologics industries. Through a series of case studies and real-life experiences, the course introduces the various regulatory guidelines (FDA and EMA) which are followed by the pharmaceutical industry for the approval of biopharmaceuticals and biosimilars. The course also highlights the important regulatory and draft FDA guidelines for next generation therapeutic modalities, such as CAR-T cell, gene therapy and novel vaccines. The regulatory guidelines for implementing QbD in biopharmaceutical processes will be introduced.
ENGR 620	Biopharmaceutical Commercialization: Strategy and Analytics	Commercialization represents the biopharma function that is most visibly tied to overall company health. This function is responsible for bringing drugs to market and overseeing their financial performance. They must work closely with development teams to manage portfolio and pipeline, while also translating successful clinical trials into viable products that are embraced by prescribers and consumers. Interaction with manufacturing is critical as well, as supply chain and demand must be aligned across these functions. Ultimately, if commercialization teams are high-functioning, this translates into strong company performance and investor confidence.
ENGR 621	Introduction to Biopharmaceutical and Biologics Production	This master level course is part of the Innovation MBA (iMBA) concentration in Biopharmaceutical Commercialization. It is intended for non-scientists and those who are new to the biopharmaceutical and biologics industries. Through a series of case studies and real-life experiences, the course introduces the history of biopharmaceutical development; beginning with first generation treatments, including insulin, human growth hormones and tissue plasminogen activator, to next generation therapeutic modalities, such as CAR-T cell, gene therapy and novel vaccines. Upon completion of this course, participants will be prepared to engage in high level discussions and decisions across all major functional areas related to the commercialization of products in the biopharmaceutical industry. This course will provide participants with a basic scientific background and the ability to participate and contribute to business-related operations that are critical to expanding areas within biopharma, including proteins and monoclonal antibodies, modern vaccines and cell/gene therapies.
ENGR 622	Biotherapeutic Formulation	The formulation of therapeutics is an integral step in the manufacturing process which ensures the stability and safe delivery of the drug product. Participants in this course will be introduced to the challenges and opportunities in formulation practice with a focus on the development of liquid formulation for proteins and monoclonal antibodies for subcutaneous and intravenous delivery. The course also includes an in-depth exploration of industry standard best practices using quality-by-design and risk-based management approaches to identify and optimize liquid formulations for early to late-phase clinical studies and product launch.

ENGR 800	Doctoral Research I	This doctoral level course is the first in a series of three courses which provide students the forum to survey the landscape of their dissertation topic with an emphasis on a deep understanding of fundamental principles and latest research in the field. Students will use this foundation to develop an experimental plan with their committee and complete an in-depth literature review for their dissertation. By the completion of this initial Doctoral Research Course / Semester, candidates will present an in-depth background overview of their research topic in oral and written form. The presentation and report should address the history / background of the topic, as well as comprehensive analysis of the literature relevant to the dissertation topic. Students will also be responsible for the completion of an online Research Ethics course, which includes the submission of brief synopses and the results of module specific case studies.
ENGR 801	Doctoral Research	This doctoral level course is the second in a series of three courses which provide students the forum to survey the landscape of their dissertation topic with an emphasis on a deep understanding of fundamental principles and latest research in the field. Students will use this foundation to develop an experimental plan with their committee and complete an in-depth literature review for their dissertation. By the completion of this second Doctoral Research Course / Semester, candidates will outline the objectives of their research and develop a detailed project proposal and present it to their research committee for review and approval. The proposal should clearly relate to the objectives and include a tentative experimental plan, timeline and needs analysis.
ENGR 802	Doctoral Research III	This doctoral level course is the third in a series of three courses which provide students the forum to survey the landscape of their dissertation topic with an emphasis on a deep understanding of fundamental principles and latest research in the field. Students will use this foundation to develop an experimental plan with their committee and complete an in-depth literature review for their dissertation. By the completion of this third Doctoral Research Course / Semester, candidates will finalize their experimental plan / project proposal incorporating the feedback and analysis provided by their research committee. If time allows and the proposal is fully approved; the candidate will be eligible to begin experimentation. The course will also afford the candidate the opportunity to prepare a publishable manuscript for the dissemination of the results of their literature review, as well as opportunities to identify appropriate venues for the presentation of the research. The course will culminate with the first-year candidacy exam.
FASHION DESIGN MANAGEMENT		
FDM 601	Design Process Timeline: P&M	This course introduces designers to the complexities of the design development calendar within a global corporate structure. Students will go through the entire design development timeline linking design/merchandising/prototype development and brand positioning processes within an overseas sourcing structure. The process will begin with an understanding of historical data and how it informs design choices. Overview of creative teams and understanding the interaction between design, merchandising, production, sales and marketing. Students will learn how design decisions impact time lines throughout the organization building toward industry wide product launch dates.
FDM 610	Social Media Metrics in Design	This course gives students an overview of how to incorporate both Social Media Metrics and Data Analytics strategically into the design development process. Student teams will research digital branded leaders who are most effectively leveraging social quantitative methods to gain data driven insight into consumer trends and in turn, product development. Overview of both Google Analytics and facebook public platforms will identify key algorithms used in the Fashion Industry. Student designers will develop strategies to grow and impact future collections through strategic analysis, thoughtful content development and focused product positioning.

FDM 617	Designing within Brand Parameters	This course will be a simulation of the complete research and design development cycle beginning with a specific design brief and designing into a targeted existing brand aesthetic. Designers will be introduced to the broad range of parameters influencing branded product offerings. They will be challenged to create within market constraints including; targeted channels of distribution, season, sku plan, delivery, targeted wholesale/cost of goods/margins, raw material sourcing and competitive landscape.
FDM 621	Building Brand Identity	The critical relationship between design/merchandising/marketing will be explored in this course with a focus on benchmarking today's global fashion leaders. The course will integrate the distinct roles of the designer, the merchandiser and the marketing team, identifying how they are strategically intertwined. Students will move beyond product design and development by creating a design/merchandising strategy for the branding aspects of a collection including: brand name, logo, labelling, packaging, hangtags, signage and web home page layout. Approaching the collection in a broader sense, in the role of the Creative Director, students will focus on communicating a well-articulated, focused and cohesive branded message across all assets.
FDM 623	Textile Design & Approval Proc	In this course, students will learn and apply the key steps in designing an industry-ready materials presentation and concept encompassing: color palette, fabric qualities, trim, hardware, surface interest, print/pattern and design concept as the starting point for a collection. Students will learn first-hand from industry experts and onsite visits the strategic design and approval processes used in color palette development, fabric and trim development and print/pattern design and development. Students will design an industry ready fabric/trim/color/hardware concept for their portfolios as the springboard to collection development. Processes covered will include Pantone palette development and analysis, trim and hardware sourcing, CAD print design, yarn dye stripe/plaid development and knit pattern design and development.
FDM 707	Strategic Design & Merchandising	This course gives students an overview of strategic design and merchandising processes. The students will use the unique approach of "reverse merchandising" to identify the key steps in the design development process. Step One will be to dissect a recent collection from an established luxury brand. In their collection synopsis students will learn the fundamentals of creating detailed line sheets, sku plans, fabrication plans, design concepts and targeted classification plans. They will do a deep dive into brand identifiers and then identify a white space representing growth opportunities within the existing collection. From that base they will design and merchandise into the targeted white space. Students will develop the skills to design into an established brand using a highly methodical and quantitative process aimed at the international luxury market.
FDM 708	3D Virtual Fashion Design Essentials	3D Virtual Fashion Design Essentials will enable students to understand the basic requirements needed to be successful utilizing industry-adopted 3D applications through hands on experience. Building on their pattern development knowledge and technical skills in 2D, students will learn to build an entire 3D collection from simple silhouettes to complicated designs utilizing fabric, fit, patterns, colors, and textures. Students will learn successful communication of quality assurance to vendors and manufacturing personnel worldwide.
FORENSIC BIOLOGY		
FB 605	Forensic Serology & Immunology	This lecture course covers the fundamentals of forensic serology. This will include the biochemical basis of biological fluid testing using classical as well as novel serological techniques. Multiple forensically relevant body fluids (e.g., blood, saliva, semen, urine, fecal matter, vaginal/menstrual fluid) will be discussed regarding chemical composition and the corresponding testing strategy associated with each fluid.
FB 606	Forensic Serology & Immunology Lab	This laboratory course covers the fundamentals of forensic serology. This will include the biochemical basis of biological fluid testing using classical as well as novel serological techniques. Multiple forensically relevant body fluids (e.g., blood, saliva, semen, urine, fecal matter, vaginal/menstrual fluid) will be applied. Practical and laboratory exercises demonstrate the techniques and their applications.

FB 607	Journal Club in Forensic Serology & Immunology	This journal club based course aims to introduce students to the collection, analysis, and interpretation of primary literature sources within the field of serology and immunology. In order to encourage a versatile learning environment, students will become familiar with both forensic and non-forensic journals. However, an emphasis will be placed on journal articles relevant to topics covered in FB605/606 Forensic Serology and Immunology. This course relies solely upon participation and presentations.
FB 610	Legal Procedure & Ethics	The primary objective of this course is to provide students with a solid understanding of the American criminal justice system, as well as its inherent ethical issues. This will be accomplished through review and discussion of Constitutional law, rules of procedure and evidence, and case law. A secondary benefit of this course will be the improvement of the students' ability to critically evaluate facts, reach conclusions, and effectively communicate and defend their positions.
FB 620	Forensic Science Forum	The goal of this course is to expose students to a wide range of topics in forensic biology. Recorded lectures and webinars supplemented with topic discussion will cover the various career paths within forensic biology. Furthermore, students will have the ability to interact with leading professionals and practitioners to gain a better insight into the qualities and capabilities necessary for success within the community.
FB 705	Forensic Lecture	Classroom discussions will expand on the application of forensic DNA analysis using STR markers, including interpretation of single-source profiles and mixtures, advanced understanding of instrument operation, and presentation of DNA results in the courtroom. Students will gain an advanced understanding of how forensic DNA laboratories operate and are managed; i.e., quality assurance programs, quality control, proficiency testing programs, validation issues, and other areas of interest. Additionally, students will be prepared to work in a forensic DNA crime laboratory, understanding quality assurance, accreditation, and other areas of importance.
FB 706	Forensic Genetics Lab	Classroom discussions will expand on the application of forensic DNA analysis using STR markers, including interpretation of single-source profiles and mixtures, advanced understanding of instrument operation, and presentation of DNA results in the courtroom. Students will gain an advanced understanding of how forensic DNA laboratories operate and are managed; i.e., quality assurance programs, quality control, proficiency testing programs, validation issues, and other areas of interest. Additionally, students will be prepared to work in a forensic DNA crime laboratory, understanding quality assurance, accreditation, and other areas of importance. The laboratory exercises will reflect classroom discussions and students will be expected to prepare courtroom ready materials (data, documents, and demonstrations). The students will be responsible for setting up and running the laboratory in a similar manner to how a real crime laboratory is run.
FB 715	Advanced Forensic Genetics	An advanced forensic biology course covering newer techniques used in DNA extraction, quantification, PCR, genotyping and sequencing. Techniques such as second generation sequencing and rapid DNA techniques will be covered as well as alternative markers such as SNPs, mitochondrial DNA, microhaplotypes, and Y-STRs. Issues pertaining to forensic biological samples such as degradation, sensitivity/specificity, transfer events and DNA persistence will be discussed. Techniques for complex mixture interpretation and associated statistical tools will also be included. An emphasis will be placed on critical thinking skills and troubleshooting of common forensic laboratory issues.

FB 716	Advanced Forensic Genetics Lab	An advanced forensic biology course covering newer techniques used in DNA extraction, quantification, PCR, genotyping and sequencing. Techniques such as second generation sequencing and rapid DNA techniques will be covered as well as alternative markers such as SNPs, mitochondrial DNA, microhaplotypes, and Y-STRs. Issues pertaining to forensic biological samples such as degradation, sensitivity/specificity, transfer events and DNA persistence will be discussed. Techniques for complex mixture interpretation and associated statistical tools will also be included. An emphasis will be placed on critical thinking skills and troubleshooting of common forensic laboratory issues. The laboratory exercises will reflect classroom discussions. The students will be responsible for setting up and running the laboratory in a similar manner to how a real crime laboratory is run.
FB 717	Journal Club in Foren Genetics	This journal club-based course aims to introduce students to the collection, analysis, and interpreting primary literature sources within the field of forensic genetics. In order to encourage a versatile learning environment, students will become familiar with both forensic and non-forensic journals. However, an emphasis will be placed on journal articles relevant to topics covered in FB705/706 Forensic Genetics and FB715/716 Advanced Forensic Genetics. This course relies solely upon participation and presentations.
FB 830	Laboratory Clerkship	A supervised full-time practicum. Principles and procedures used in the forensic analysis of biological fluids and genetic material, including their detection, extraction, quantification, amplification and analysis will be used to process casework samples, conduct analyses, interpret results, write reports, and participate in moot court experiences. Students are provided multiple hands-on casework samples and experiences with the assistance of forensic practitioners in the preparation and execution of appropriate reports and court testimonies.
FB 870	Master's Thesis Research	
FB 880	Master's Thesis Research	
FB 890	Master's Thesis Research	
FORENSIC TOXICOLOGY		
FT 605	Analytical Forensic Toxicology	This course will provide students with an introduction into the analytical instrumentation most commonly used in performing certain forensic analyses. Forensic science depends upon the strength of the data generated by the various analytical techniques and conclusions based upon the data. The course also includes a review of basic functional group chemistry, principles of sample extraction, and derivatization chemistry. Students will study instrumentation at three levels: theory of operation, practical understanding of the component functions and design, and finally, application of instrumental techniques to forensic toxicology and chemistry processes. Each technique will be studied with respect to the function of various components, the strengths and weaknesses of each technique, discussion of the implementation of each technique will also be covered. Attention will be given to column selection and properties, sample introduction and preparation techniques, detection systems, and data analysis. Mass spectrometry will be covered, including theory of operation, hands-on operation, instrument maintenance, data interpretation and review.
FT 606	Analytical Forensic Toxicology Lab	This course will supplement the theory and principles covered in FT605 Analytical Forensic Toxicology. Students will gain experience using various chromatographic techniques including gas chromatography, liquid chromatography, and thin-layer chromatography. Additional topics will include spectroscopic analysis; including atomic absorption, UV-VIS, and FTIR. Data obtained using the various techniques will be discussed in terms of what significance this data possesses in a forensic framework. An overview of quantitative and qualitative analysis performed analytically will be presented.

FT 610	Legal Procedure & Ethics	The primary objective of this course is to provide students with a solid understanding of the American criminal justice system, as well as its inherent ethical issues. This will be accomplished through review and discussion of Constitutional law, rules of procedure and evidence, and case law. A secondary benefit of this course will be the improvement of the students' ability to critically evaluate facts, reach conclusions, and effectively communicate and defend their positions.
FT 620	Forensic Science Forum	The goal of this course is to expose students to a wide range of topics in forensic toxicology. Recorded lectures and webinars supplemented with topic discussion will cover the various career paths within forensic toxicology. Furthermore, students will have the ability to interact with leading professionals and practitioners to gain a better insight into the qualities and capabilities necessary for success within the community.
FT 705	Advanced Analytical Forensic Toxicology	This course will provide students with an in depth understanding of the analytical instrumentation most commonly used in performing certain forensic analyses. Students will be able to understand above and beyond the theory of operation, practical understanding of the component function and design, and application of the various instrumental techniques to applicable forensic toxicology and criminalistics chemistry and will be able to perform system suitabilities, database searching, troubleshooting and method optimization. Separation techniques covered in FT605 Analytical Forensic Toxicology will be covered in greater depth and additional separation techniques will be introduced.
FT 706	Advanced Analytical Forensic Toxicology Lab	This course will supplement the theory and principles covered in FT705 Advanced Analytical Forensic Toxicology. Students will operate instrumentation, troubleshoot, perform basic maintenance tasks and review generated data from the instruments. In addition, students will learn and perform method development and validation procedures for common drugs of abuse.
FT 715	Interpretive Forensic Toxicology	This course deals with the detection, identification and quantitation of foreign chemicals (toxins) in the body. In order to accurately interpret toxicological findings, it is essential that the toxicologist has an understanding of the pharmacology of that substance and the pathological effects it has on the body. In this context, Forensic Toxicology can be divided into two categories, post-mortem toxicology and human performance toxicology. This course will provide the student with the skills for development of a detailed knowledge of the types of toxic substances and matrices encountered in Forensic Toxicology and the procedures by which these are tested in the laboratory. Students will also utilize their theoretical knowledge of pharmacology in the application to Forensic Toxicology casework.
FT 716	Interpretive For Toxicology Lab	
FT 810	Laboratory Clerkship	A supervised full-time practicum. Principles and procedures used in the forensic analysis of drugs and toxins, including their detection, extraction and purification from biological matrices, and quantification will be used to process casework samples, conduct analyses, interpret results, write reports, and participate in moot court experiences. Students have multiple hands-on casework samples and experiences with screening procedures and analytical methodologies with the assistance of forensic practitioners in the preparation and execution of appropriate reports and court testimonies.

FT 815	Regulatory Issues in Forensic Toxicology	Scrutiny of forensic science has never been greater, and the expectations of the public, the courts, Congress and others have never been higher. How are the forensic sciences responding, and what are our successes, limitations and proposed solutions going forward? This course considers quality management, ethics, professional practice, quality control and quality assurance components that help answer these questions. The course will emphasize the obligations of the laboratory, its management and scientists, and accreditation, certification and professional practice resources that have been put in place to promote quality and forensic reliability. The course will take a critical look at criticisms from Congress, the defense community and from the 2009 National Academy of Sciences (NAS) report on Strengthening the Forensic Sciences in the United States, which identified deficiencies in laboratory management and support structures, and questioned the underlying basis of some of the science being practiced. Specific components of quality management systems, including education, quality control, quality assurance, and method validation will be examined. The overall structure of a forensic laboratory's operations will be discussed with practical considerations about implementing a thorough overall quality management approach.
FT 820	Clerkship- Forensic Toxicology	
FT 830	FT Laboratory	
FT 870	Master's Thesis Research	
FT 880	Research-Forensic Toxicology	
FT 890	Master's Research	
GENETICS		
GE 610	Transcriptional Regulations	An advanced seminar course which focuses on current topics of interest in the regulation of eukaryotic gene expression. Regulatory mechanisms of eukaryotic gene expression during development will be covered. Emphasis will be placed on the types of experimental methods used to study gene expression in eukaryotes.
GE 611	Molecular Genetics I	This course is a comprehensive overview of the fundamental genetic principles and mechanisms of prokaryotes and eukaryotes, from bacteria to Drosophila. Section I (9 classroom hours) covers fundamental genetic principles and molecular mechanisms, including genetic mapping, an overview of the structure of genes and chromosomes, replication and transcription, as well as plasmids, recombination and DNA repair. Section II (11 classroom hours) covers basic yeast genetics and molecular biology, from concepts of mutant classification and suppression, yeast plasmids, mating, knockout technology, sporulation, tetrad analysis and recombination mechanisms, to yeast genomics. Section III (15 classroom hours) covers developmental principles in relation to genetic analysis, including gradients, signals, and transcription factors in development, classifications of mutants and phenotypes, polytene chromosomes, transposable elements, genetic screens both classical and current, mosaic analysis, conserved pathways including homeotic gene complexes, their regulation and function, and the regulation of gene expression by chromatin structure.

GE 612	Advance Topics in Molecular Genetics	This course explores advanced (beyond those covered in GC550 core course) topics in the molecular genetics of eukaryotes. Primarily centered on mammalian genetics and using the mouse as a model system, it also covers selected topics in the yeast, Drosophila and zebra fish model systems. After a brief review of the principles of Mendelian genetics, including equal segregation and independent assortment, the course will cover (among other topics); the mouse as a genetic model, manipulating the mouse genome, bioinformatics and mouse models of human disease. The course will conclude with topics of interest in the non-mammalian systems.
GE 636	Regulation of Cell Cycle & Apoptosis	Factors controlling cell growth and mechanisms initiating cell proliferation will be discussed. Foremost will be a consideration of proto-oncogenes and their role in the regulation of cell cycle traverse. Mechanisms of proto-oncogene activation to oncogenes and the role of oncogenes and suppressor genes in uncontrolled cell proliferation and cell transformation will be discussed via a consideration of original papers and student presentations. Assigned reading.
GE 637	Human Genetics	This is a team taught mammal genetics course that assumes a basic knowledge of molecular biology, molecular genetics and classical genetics. It covers a wide range of topics from clinical cytogenetics, Mendelian genetics with examples of specific diseases, population genetics and multifactorial inheritance, to physical mapping, genome informatics, mutation detection and more diseases that exemplify certain genetic principles. Finally, functional genomics, including DNA microarray analyses and applications and SNPs (single nucleotide polymorphisms) and applications are introduced.
GE 651	Pathobiology of Cancer	The course covers the classification of human cancers, characteristics of neoplastic cells, epidemiology of cancers, causes of cancer, experimental carcinogenesis and the immune response against neoplastic cells. Lectures and discussions are held on these individual topics. Assigned readings.
GE 652	Tumor Cell Signaling	This advanced seminar focuses on some basic cellular mechanisms (signal transduction pathways in cancer cells) fundamental to the pathogenesis of cancer in general and to specific tumor models.
GE 710	Current Literature in GGCB I	Students and faculty report on recent developments in areas of research interest on departmental research projects. Visiting scientists are also invited to present seminars. Required for all graduate students in Genetics.
GE 715	Seminar I	
GE 720	Current Literature in GGCB II	Students and faculty report on recent developments in areas of research interest on departmental research projects. Visiting scientists are also invited to present seminars. Required for all graduate students in Genetics.
GE 725	Seminar II	
GE 730	Current Literature in GGCB III	Students and faculty report on recent developments in areas of research interest on departmental research projects. Visiting scientists are also invited to present seminars. Required for all graduate students in Genetics.
GE 735	Seminar III	
GE 910	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.

GE 920	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
GE 930	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
GE 940	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
GEODESIGN		
GEOD 600	3D Modeling for Geodesign	Geodesign is a planning and design process that is based on physical and biological information, references social and economic information and is holistic and interdisciplinary. Allied design professionals need to communicate, analyze, and model the impacts of change in the built environment. In this introductory course, students will begin to apply state-of-the art 3D geospatial modeling technology to solving real-world urban planning and design problems. Various geodesign techniques, digital technologies and scenario management tools will be introduced and applied. Prerequisite: GEOD 610
GEOD 602	Geodesign Studio	In this intermediate design studio, students will form collaborative teams and apply geospatial analysis techniques and information modeling to a more complex urban design problem. Students will work cooperatively with the community client/partner throughout the design process. Community members will be instructed how to use one or more geospatial tools in the decision-making process. Prerequisite: GEOD 600, and GEOD 615 or LARC 515
GEOD 603	La Tech: Advanced Grading	This Advanced Grading course augments what the students have learned in their first Grading course, plus covers in more depth other sustainable aspects of landform manipulation for design and stormwater management. Computer applications will be used as a learning tool. Field trips to sites that are particularly appropriate for observing, measuring, and experiencing the sculptural qualities and capabilities of landform are also an integral component of this course. Prerequisite: LARC 207
GEOD 604	Hydrology	Hydrology examines sustainable water resource issues as they relate to landscape planning and site planning and design within the urban or urbanizing context. This includes the theory and techniques associated with soil and water conservation comprehension of the why, when and where that leads to sustainable planning or design strategies. Topics include surface water hydrology, stormwater runoff estimation, sustainable stormwater management techniques, watershed planning, flood routing and impact mitigation, and erosion and sedimentation control tools and regulations.

GEOD 605	Geodesign Research Studies	In this culminating studio, students will work individually or in small groups on an applied research project that was developed through a previous GeoDesign design studio, a technology course, or from an outside source. The applied research outcomes will then be used and tested as part of a community outreach planning and/or design project. Prerequisite: GEOD 602 and GEOD 616
GEOD 606	History of Landscape Arch 1	This survey course covers significant examples of landscapes and landscape design from the eastern, central Asian, and western regions of the world, produced from ancient times through the 19th centuries. Students will be introduced to the cultural and social history of each epoch as a means of critically analyzing key historical works of landscape design and addressing the ideas and concepts imbedded in the term landscape.
GEOD 607	Explorations in Geodesign	In this seminar/lab course, students learn to explore cutting-edge geospatial techniques, applications, and data sources and determine whether these approaches are appropriate, useful and cost-effective in a production environment. For example, LiDAR-enabled spatial robotics allows for mobile spatial data collection within buildings, but is this an appropriate technique to build a 3D contextual basemap? And how can this technology be applied to exterior urban spaces Prerequisite: GEOD 602 or GEOD 617
GEOD 608	History of Landscape Arch 2	This course is the third of a four-term sequence of history/ theory courses. It surveys key examples of landscape architecture from the mid-19th century to the present time. Students strengthen their vocabulary for analyzing and evaluating the designed landscape. Students are also introduced to the influential personalities, projects, events, concepts and thoughts that were pivotal in the philosophical and ethical development of the profession of landscape architecture.
GEOD 610	Introduction to GIS	This course is an introductory course for Geographic Information Systems (GIS) and is a prerequisite for those in the MS in GeoDesign Program that do not have prior GIS training. GIS is a computer-based tool that uses spatial (geographic) data to analyze and solve real-world problems. Specific GIS methods and topics covered include cartography, demographics, site selection, transportation studies, land use scenarios, and environmental applications. This is a foundation course for the MS in Geodesign Program.
GEOD 612	Local Flora	An introduction to regional native plants used in landscape architecture and ecological restoration. Characteristics,terminology and keys used in identifying plants and plant families will be taught as well as sight recognition of common species. Other topics include plant growth, development and propagation, optimal habitats, and recognition of best management practices. Field work at local/regional sites constitutes a significant part of the course.
GEOD 613	Sustainable Planting Design	In this course students apply the ecological needs of plants to real situations such as greenroofs, xeriscaping, habitat management, brownfield restorations, meadows and highway plantings. The course stresses ecological relationships among plants and how those relationships are used in the design of these environments. In order to design and maintain these environments students need to understand planting design as well as ecology.
GEOD 614	Construction Docs	The major emphasis is the preparation of a complete set of technical construction documents with specifications,sustainable practices, and cost estimates. Specific topics include: site demolition, layout and dimensioning, and specification writing.

GEOD 615	Advanced GIS Urban Spatial Analytics I	This advanced GIS course will cover topics in geospatial technology as related to landscape architecture and geodesign. The course prepares students to apply GIS within practical design processes such as site preparation and analysis; modeling terrains and hydrologic processes; integration of sustainable design criteria; and modeling the built environment in 3D. While this course will cover a broad suite of tools within the ArcGIS Desktop Platform, it will place heavy emphasis on raster-based GIS processes. This course will also feature workshops/presentations with GIS professionals working in landscape architecture and other design disciplines. Prerequisite: GEOD 610 or LARC 310
GEOD 616	Information Modeling	Geospatial data will be used as the basis for advanced information modeling which is an integrated process for digitally exploring, defining, representing, analyzing and visualizing a project's physical and cultural characteristics during design and management. The scales of building, campus, neighborhood, and city will be studied. Principles of spatial modeling, integrated project delivery and lean design will be discussed in relation to this process. Prerequisite: GEOD 600
GEOD 617	Advanced GIS for Urban Planning and Development	This advanced geospatial course will focus on analysis and modeling of urban structure and dynamics. The aim of this course is to prepare students to apply GIS processes within practical situations, such as demographic and population research; real estate development; transportation modeling; and economic analysis. While this course will cover a broad suite of tools within the ArcGIS Desktop Platform, it will place heavy emphasis on the real world context of data collection, cleaning and preparation for analytics. Exercises will include simulating and modeling urban transportation systems, analyzing and modeling urban growth, and predicting urban changes and impacts. This course will also feature workshops/presentations with GIS professionals working locally in urban planning and development. Prerequisite: GEOD 610 or LARC 310
GEOD 618	Landscape Technology: Grading	This course focuses on the principles and techniques of landform manipulation for design and drainage. Students develop an understanding of contours, contour manipulation, and site-construction methodologies. Topics include topographic and grading problems in landscape engineering: drainage plans, grading plans, spot elevations, road alignment, sections and profiles and cut-and-fill calculations.
GEOD 619	Plant Community Ecology	This course investigates how interactions within plant species, between species, and between species and their environment influences plant community structure. Questions explored include: How many species are in a given habitat type? Why these species and not others? How do they interact with each other plants? What controls their abundances in natural and urban landscapes? Students will learn how plant distributions are influenced by environmental conditions with a particular emphasis on the urban environs. In-the-field exercises constitute a significant portion of this course.
GEOD 620	Soils	This course examines soil as a living organism and foundation for all life of earth. This course discusses factors of soil formation and the basic physical, chemical, ecological, and morphological soil properties that affect soil characteristics in managed and natural landscapes. This is an interactive lecture/laboratory course complemented by local field trips with emphasis on soils from pedon to landscape as resources for environmental quality and design.
GEOD 621	Environmental Policy	Environmental problems are essentially social, economic and political problems. This course traces the evolution environmental policy, legislation and regulations, both in the U.S. and worldwide, including the background and context of environmental policymaking. Students will also examine the substantive problems and political process of environmental movements, and contemporary environmental thought with regard to issues of sustainability and environmental justice.

GEOD 625	Internet GIS Tech for Design and Development	This course introduces students to online geospatial technology tools applicable in various fields including planning, landscape architecture and real estate development. Software utilized in this course aids professionals in site analysis, land planning, urban design, real estate development, market research and feasibility analyses. Emphasis is placed on the ArcGIS Online platform, an instrument used to evaluate site potential, analyze geographic datasets, host and share impactful and informative applications. Students will utilize tools and data pertaining to landscape planning, the dynamics of neighborhood change and spatial growth modeling.
GLOBAL FASHION ENTERPRISE FOUNDATION		
GFEF 501	Prototyping	Garment Development Students will have a basic understanding of garment construction combined with flat-pattern concepts. The use of industrial equipment and basic slopers will be utilized to produce a sample book of construction details and garments.
GLOBAL FASHION		
GFE 600	Fashion Immersion	This course introduces students at a graduate level to the global fashion industry, with a particular focus on benchmarking successful organizational strategies. The course integrates textile functionalities, usages, design concepts, and apparel manufacturing. Students visit US fashion houses and participate in experientially focused workshops. Students will evaluate fashion strategies, from both the technical and business perspectives, and examine the conceptual frameworks and core disciplines within the Global Fashion Enterprise curriculum.
GFE 611	Product Development / Entrepreneurship	In the development of any apparel product, attention must be given to form, function, fit and appearance and to their interrelationship. Form involves the influence of preference and individual choices. Function includes such aspects as ?fitness for use,? taking into account levels of activity, gender and age. Account must also be taken of the influence of markets, as well as the opportunities and constraints presented by design, cost and manufacturing systems. At the managerial level, the individual is faced with constant change from original concept to the end product. Multiple adjustments to the product arise at every phase requiring tremendous ingenuity and problem-solving skills. Graduates will be faced with this kind of process in the apparel industry and need to manage and follow through with the development of a product.
GFE 612	Technology in Fashion	This course aims at showing that state-of-the-art technology in a given field has become an essential component for strategic leadership, profitability and stable employment. The point is made by providing a broad perspective on the major technical advances experienced by the apparel industry from the 1980s and their positive impact on the national industries where they originated and/or were adopted. Analysis of the difficulties met by high wage countries failing to follow that course helps to reinforce the point. Review of the factors accounting for these advances brings out the critical importance of technology transfer and fusion in the formulation and development of basic concepts. Detailing both processes offers the opportunity to introduce the notion of systemic thinking and its growing influence on management style. It is intended that the student will gain a global perspective of the textile and apparel business and of the growing role played by advanced technology and its impact on finances and personnel.

GFE 621	Fashion Global Marketing & Sourcing	U.S. textile and apparel companies are under siege, facing competitive threats that have been continually mounting for years. What it takes to be successful in the future is explored. The concept of "business as usual" has long outlived its usefulness, and new and refreshing approaches are necessary. Students will be introduced to avant-garde management concepts often espoused, but seldom adopted, by most textile and apparel managements. The course is designed to introduce the student to the global perspective of today's apparel industry and to prepare the student to make critical international marketing and sourcing decisions within a complex economic environment. Students will explore the major variations which occur across international markets - economic, social, and cultural; examine the behavior of business within different marketing and manufacturing contexts; and consider the factors involved in making effective global marketing and sourcing decisions.
GFE 721	Global Fashion Project 1	Students research, select and conduct preliminary work on a project falling either within the: (1) Product Concept Track in which they develop a fashion line consisting of apparel, accessories, or home textiles that could be produced and sold online or in traditional retail establishments, or (2) Business Concept Track in which they develop a business plan or implement an innovative concept at an existing company. Weekly and summative critiques are held with faculty and industry associates.
GFE 722	Global Fashion Project 2	Continuation of GFE 721. Product track students' focus on designing, merchandising, sourcing, quality assurance, and material procurement decisions related to their product. They identify product specifications, conduct a cost analysis, margin realization, and risk assessment that will form the basis for the development of a supply chain strategy. Business concept track students integrate key activities, resources, and financial requirements for a commercialization plan. Concludes with a presentation to industry critics.
GFE 723	Global Fashion Project 3	Continuation of GFE 722. Students implement their product or business concept and write a formal business plan. The final strategy for a visual merchandising plan, or business plan development, will be solidified and implemented. Students will conduct pilot testing to assess the feasibility of their plans and will present their plans after interviewing clients and reviewing their plans with industry critics. Each phase of the new business lifecycle concludes in a progress presentation with industry critics.
GFE 725	Brand Driven Design & Innovation	Brand Driven Design & Innovation prepares students to evaluate mass and luxury markets by conducting research on the Brand's DNA, examining the marketing mix on a global scale, preparing a situational analysis and executing innovative presentations. This course is designed to train future professionals in market analysis, market entry or exit strategy, creating perceptual positioning maps, and forecasting, while analyzing elements of the value chain to formulate a brand strategy. Brand Design & Innovation will also detail the primary methods of social research and their practical application in the field of fashion.
GFE 727	Omni-Channel Retail Systems	This course will examine the organizing principles and strategies applied by retailers that market goods and/ or services using an omni-channel approach to generate sales and increase revenue. Emphasis will be placed on retailers involved in integrating operations of two or more channels including bricks, ecommerce, digital, catalog, vending machines, television business models, and social commerce strategies.
GFE 729	Product Lifecycle Management	Product Lifecycle Management (PLM) has become one of the emerging technology applications in business, specifically in apparel, accessories, footwear, textiles, and other fashion-related industries. Learn how PLM software can accelerate your product development process with digital asset (image) management, tech pack management, quotation and bid management, sample and production planning and tracking, pre-concept line management, and materials management. In this hands-on course, you will develop, manage, and edit a technically accurate, complete mini-collection in GERBER comprehensive suite of PLM tools developed specifically for fashion companies.

GFE 732	Global Fashion Seminar	This seminar course features speakers from across the fashion value chain who share their experiences and career insights. Students reflect on the implications of the topics presented for their own careers, relating concepts and insights to material covered in other Global Fashion Enterprise courses. Students have the opportunity to network informally with course speakers. Prerequisite or Corequisite: GFE 600
GFE 732A	Global Fashion Seminar I	This seminar course features speakers from across the fashion value chain who share their experiences and career insights. Students reflect on the implications of the topics presented for their own careers, relating concepts and insights to material covered in other Global Fashion Enterprise courses. Students have the opportunity to network informally with course speakers.
GFE 732B	Global Fashion Seminar II	This seminar course features speakers from across the fashion value chain who share their experiences and career insights. Students reflect on the implications of the topics presented for their own careers, relating concepts and insights to material covered in other Global Fashion Enterprise courses. Students have the opportunity to network informally with course speakers.
GFE 734	Fashion Supply Chain Management	The course provides a broad introduction to many critical facets of supply chain. Students in this course will understand existing tools utilized in managing inventory and logistics in the global supply chain. The course covers topics in inventory logistics management, network design, value of information sharing, the international supply chain, supply chain contracts, and risk management.
GFE 793	Global Fashion Networking	This course exposes students to fashion ecosystems through an international study tour, coupled with classroom and experiential instruction. Students will tour design houses, mills, apparel factories & retail locations throughout the country (or countries) of focus, identifying best practices in merchandising & supply chain management within these organizations. Students will gain knowledge of product development & marketing, the manufacturing environment, quality assessment, and customer service. Students will acquire global competencies and understanding and will have the opportunity to hone their career aspirations and expand their professional networks through discussions with global fashion executives and hiring managers. Prerequisite: GFE 600
GFE 797	Selected Topics	Selected Topics Content will vary in response to current issues.
GRADUATE CENTER		
GC 510	Database Design & Management	This applied, how to course lays the groundwork for an object-oriented approach to relational database development. The approach focuses on identification, formalization, and verification of study data. Students will learn how to collect and organize information into well-developed objects and relationships. Students will have the opportunity to perform statistical analyses on several real data sets using general-purpose statistical software packages. The course will also introduce students to Epi Info, a public domain epidemiologic database and analysis application.

GC 515	Qual Measurement & Outcome Ana in Hlt	Measuring and improving quality and safety in health care are major public health policy issues. This course is concerned with the conceptualization and measurement of quality of care in a variety of health care settings. The course begins with a discussion of the current quality crisis in the U.S. healthcare system, and focuses on systems for defining, measuring, and improving quality. Special emphasis is placed on the measurement of care outcomes, including approaches to data collection and risk adjustment. Drawing on a cadre of guest speakers who are actively engaged in quality improvement, the course then examines how this conceptual framework is applied in a variety of settings and public programs, including hospitals, office based practice, managed care organizations, the Medicare and Medicaid programs, and employment based health insurance. Written assignments further help class participants gain practical experience in applying the material to real life practical experience in applying the material to real life quality improvement issues.
GC 525	Information Systems Management	This course is designed to provide a detailed understanding of information systems and their use within the modern organization. It will explore the essential components of the systems and analyze how each is developed and linked into a production system. Contemporary computing concepts will be examined and a profile of strategic information management issues will be presented. Particular emphasis will be placed on the role of technology in assisting organizations to meet their operational and strategic goals. The course incorporates Internet activities, spreadsheets, and a database management package.
GC 526	Presentation Skills	To present scientific findings, explain a complex project, win a new account, or secure financial support, you'll need good communication skills. This course will prepare the student to make persuasive oral and poster presentations. The first half of the course will be devoted to oral presentations. Instruction in the use of software for writing oral presentations, producing handouts, and producing visual materials will be provided as well as the opportunity to use such software. The second half of the course will be devoted to poster presentations. Instruction on the use of software for producing posters and attendee handouts will be provided as well as the opportunity to use such software.
GC 529	Lab Animal Science	This course will introduce students to laboratory animal science. Topics will concern regulations and their effect on the care and use of laboratory animals, the biology, husbandry, and diseases of common laboratory animal species, ethical and scientific issues, experimental surgery and animal research techniques.
GC 535	Intro to Genomics & Bioinforma	This course provides students with an overview and understanding of the utility of genomic-scale data in a biomedical setting and the computational and analytical tools used with these high dimensional data sets. Various topics will be covered leading to the highly integrated state of the art approaches in use today. Lecture materials will be combined with hands on tutorials and weekly projects in an integrated fashion. Several guest presentations from on campus experts will supplement the course content. Students should gain a broad working knowledge of the issues and capabilities of genomics, bioinformatics and their integration.
GC 540	Biomedical Informatics	
GC 550	Found in Biomedical Sciences	This course is designed to provide a basic knowledge of biochemistry, genetics, molecular biology and cellular biology to the beginning student. The primary goal is to convey knowledge of the molecular and cellular mechanisms controlling cell, tissue, and organ system function using material drawn from biochemistry, cell biology, genetics, pharmacology, and physiology. The course will familiarize the student with the powerful technologies used in scientific research and will train the student in the communication of science through informal sessions on evaluation of published literature, scientific writing, oral presentations, and information retrieval.

GC 550A	Foundation in Biomed Sciences- Genetics	
GC 550B	Foundations in Biomed Sciences -Biochemistry	
GC 550C	Found in BiomedSci- CellBiology	
GC 550D	Foundations in Biomedical Sciences- Tool Boxes	
GC 558	Intro to UNIX & Program in C	
GC 559	Intro to R Programming	
GC 560	Data Visualization	
GC 561	Data Structure & Algorithms	
GC 562	Computational Genomics	
GC 600	Managerial and Teamwork Skills	The goal of this course is for students to significantly improve their understanding of the basics of management. The objectives are: 1) to increase the knowledge of the vocabulary and processes of management, 2) become aware of management trends and its importance, 3) to closely interact with one of the new trends in management, 4) to improve management skills that are necessary for a successful career
GC 601	Neuro-pharmacology: Nerv System	
GC 605	Performance Improvement	This course provides an introduction to the principles and concepts of Performance Improvement, (similar to the concepts of Total Quality Management, TQM). Emphasis will be on the importance of employee involvement and critical nature of customer focus. Material will demonstrate why performance improvement is so important in any industry and how these principles and concepts can be applied. It will provide an orientation to the analytical tools used in performance improvement projects, and apply them to real work situations. Students will differentiate between the role of the project team and the role of line management. Class will discuss national quality awards and benchmarks.
GC 610	Strategic Management	This course introduces the student to the Strategic Management Process as a base, to build on the basic management skills that the student has developed to date. The student will learn the nature and importance of planning; develop a "plan" for planning; relate planning to change management; and outline, investigate, and use the strategic management process. The student will learn to perform a situational audit, formulate program strategies and long and medium-range objectives, and learn the steps in strategic implementation.
GC 615	Grants & Contracts Management	This class addresses critical knowledge areas for research administrators including finance and accounting, compliance, legal issues and organizational behavior. Through participation in this course, the student will learn the leadership and administrative skills you need to effectively monitor, support, and facilitate research administration.

GC 617	Management of Pharmaceutical Drug Development Projects	This course focuses on managing drug development projects in the pharmaceutical industry. The emphasis will be on the development of biologics; that is, large protein molecules such as antibodies. Faculty from Centocor, a Johnson & Johnson company, will teach this course. The course begins with an introductory lecture on project management and how the discipline is applied in the development of pharmaceutical products. Also covered will be how scientific, regulatory and commercial personnel work on teams to develop strategies and execute development. The class will be divided into small working teams for homework assignments and for the final examination. How compounds are discovered and tested before entering development, and how commercial input is integrated into early planning follow this. Challenges faced by manufacturers of large protein molecules will be described, followed by the essential elements of pharmaceutical project management (time costs, and resources). Lectures next will cover risk management, decision making, and portfolio management. The last lecture will deal with how drugs are launched and commercialized. Finally, the teams of students will present their development plans to a mock company management board.
GC 620	Financial Management	This course will provide practical approaches to budgeting, financial analysis, and the management of financial resources as it relates to resource management and accountability. Conceptual and "real world" issues will be addressed with each topic. Upon completion, the student will be able to: 1) describe the role of budgeting as a key component of the administrative process, 2) develop, defend, and implement a departmental/ program budget, 3) evaluate the financial status of a department or operating unit, 4) use a variety of analytical methods to support sound management decision making and improve the management of scarce financial resources.
GC 621	Biotechnology Venture Management	Students will be taught how to identify and analyze the factors that contribute to the creation of successful new business ventures. They will learn to consider the management problems associated with the founding of a new enterprise, either as a small business or as a part of an existing corporation. They will discuss the concepts and use the methodologies for putting together a successful business plan. Emphasis in the course will be on technology-based innovation.
GC 622	Cases in Financial Management	The course is designed to provide a Case Study approach for the implementation skills learned in GC 620. Students will work as Department Managers in a health care or academic "case" organization reviewing monthly financials, recommending actions based on their review, and preparing an annual budget. Students will complete a formal budget presentation and "defense" and attend mock meetings of Department heads with the instructor acting as CEO or CFO of the organization.
GC 625	Drug Development Issues	This course will introduce students to the drug development process primarily as steps post-basic research. It will examine the domestic and international regulatory environment, current requirements and new drivers in the development process—specifically outcomes research and pharmacoeconomics.
GC 630	Fundamentals of Clinical Trials	This course introduces the fundamentals of design and analysis of clinical trials. Some of the design issues to be discussed include specifying and operationalizing the specific question of interest, the role of a control group randomization, blinding, and sample size determination. The course will focus on statistical aspects of the analysis of clinical trials, including various statistical estimation and testing procedures, the intent to treat principle, interim analysis, and statistical and scientific inference. Students will learn to critically review published reports of clinical trials through participation in small group discussions and individual written critiques.

GC 633	Topics in Bioinformatics	An intermediate to advanced level course for students with a working knowledge of biochemistry, protein chemistry, molecular biology, genetics and basic bioinformatic skills. The course will cover topics in information theory, information technology, database structure formats, local and global sequence alignments, matrices, dynamic programming methods, network and pathway modeling, advanced phylogenetics, whole genome alignments, pharmacogenetics, chemoinformatics, proteomics, and protein modeling.
GC 635	Fundamentals of Clinical Trial Management	This course introduces key principles and practical applications for the development of new pharmaceutical compounds. It will 1) introduce the student to the total clinical research process from the perspective of the current Good Laboratory Practices (GLP) and the current Good Clinical Practices (GCP), including specific global regulatory guidelines frame-working the development and approval of new pharmaceuticals; 2) focus on the responsibilities and effective interactions between the investigating research site and the various regulatory entities charged with ensuring the protection of the human research subject as well as the overall integrity of the clinical trial and the sponsor; 3) ensure that the student will be able to relate 'real world' experiences and techniques to regulatory requirements, necessary to effectively prepare for and conduct a variety of clinical trials from the perspective of the investigator and sponsor.
GC 636	Prin Car Management-Diverse BM Careers	This course will provide biomedical graduate students and postdoctoral fellows an understanding of career patterns of biomedical scientists while exploring employment markets of these professions. Career development of current professionals will be explored. Discussion of the career development process will enable students to make career choices based on assessment of their interests, skills, and values coupled with employment trends, information and resources. Students will investigate (examine/evaluate) both traditional and non-traditional career paths in biomedical science. Students will develop the skills needed to make informed career decisions that address present and future job realities.
GC 637	Advanced Clinical Trial Management: Careers	
GC 640	Research Ethics & Responsible Conduct	This graduate seminar course is designed to familiarize students with the ethical dilemmas inherent to the conduct of research. Topics to be discussed include codes of ethical behavior, research design, conflicts of interest, informed consent and the appropriate use of animals. The student will be required to prepare a paper on the analysis of one or more case studies.
GC 642	Fluorescence Microscopy	
GC 645	Genomics & Bioinformatics	To provide students with an overview and understanding of the utility of genomic-scale data in a biomedical setting and the computational and analytical tools used with these high dimensional data sets. Various topics will be covered leading to the highly integrated state of the art approaches in use today. Lecture materials will be combined with hands on tutorials and weekly projects in an integrated fashion. Several guest presentations from on campus experts will supplement the course content. Students should gain a broad working knowledge of the issues and capabilities of genomics, bioinformatics and their integration.

GC 650	Economic Analysis of Healthcare Interventions	This course provides a thorough introduction to the field of pharmacoeconomics and disease management. Beginning with the basics such as reasons for study, the challenges facing experts, and the significance of the science, the course will propel students through the practical knowledge necessary to embark on current, valid, comprehensive studies. Cost benefit, cost utility, cost effectiveness methods will be defined in detail. Accounting and finance will be integrated with statistics and database skills. Students will learn how to use available technology to their advantage and will gain hands-on experience by conducting case studies of their own. In addition, the course includes a general introduction to managed care, including all relevant terminology, government institutions, current public policy, and varying viewpoints of experts in the field.
GC 652	Decision Support and Shared Decision Making in Health Care	
GC 660	Statistical Methods of Data Analysis	This introductory course covers the basics of descriptive and inferential statistics. Students will learn about the role of sampling and probability in statistical decisions. Applications include confidence intervals and hypothesis testing about population means and proportions, and Chi-square.
GC 655	Clinical Epidemiology	This course will cover a variety of topics related to clinical epidemiology including measurements of disease frequencies and associations, bias, confounding, interpretation of diagnostic information, and cost effectiveness.
GC 660	Statistical Methods for Data Analysis	Students learn to apply the principles and techniques of basic statistical analysis, including descriptive and inferential statistics. Applications using the normal, t and chi-square distributions are emphasized. The SAS software package for analysis is included.
GC 661	Data Analysis w/Stat Software	
GC 662	Concepts ScInference & Study Des	
GC 663	Statistics for Basic Sciences	
GC 665	Cell Signaling	This course will focus on the regulation of cell function through an understanding of signal transduction mechanisms. Emphasis will be placed on cell biology aspects of signaling pathways, structure-function of signaling proteins, dysregulation of signaling pathways in disease and the mechanism of action of drugs that target signaling proteins.
GC 670	Stat Reasoning of Biomed Research	Students learn the basics of least squares linear regression Pearson and multiple correlation and binary logistic regression. Examples from the published literature are illustrated.

GC 675	Cancer Immunology	Cancer immunology is a branch of immunology that studies interactions between the immune system and cancer. After an introduction section on the history and foundation of cancer immunology, the course will focus on various aspects of the interaction of cancer and the immune system within the tumor microenvironment and current immunotherapeutic approaches to treat cancer. Through participation in this course, students will learn the complex nature of cancer immunology. Students will learn how various immune cell types interact with cancer cells, how those immune cells promote or impeded cancer immunity, and mechanisms of immune evasion by cancer. Students will learn current approaches to cancer immunotherapy, while being challenged create hypotheses about mechanisms underlying success, failure, and toxicity of cancer immunity.
GC 680	Lab Techniq-Molec Bio	The purpose of the course is to introduce the students to basic techniques in molecular biology, including genetic engineering. Beginning with an introduction to the biological significance of DNA and the fundamentals of good laboratory practices, students will become familiar with: purification and characterization of nucleic acids; cloning vectors, enzymes used in DNA cloning, and E. coli host strains; principles of restriction mapping, recombinant library construction, and the polymerase chain reaction; production and use of nucleic acid probes in hybridization to filter-immobilized DNA. Students will be instructed in the biochemical and biological concepts involved in the selected molecular biology techniques so that, at the completion of the course, students will have the ability to work through technical problems in this 'kit-oriented' era, and to assimilate new techniques as they arise.
GC 690	Regulatory Issues in Scientific Research	The course is designed to familiarize students with regulations governing scientific research, specifically research involving human subjects. Lectures and discussions will focus on the history of regulations governing human subject research, regulations protecting human research subjects, regulations concerning the development of new drugs and devices, and regulations dealing with the use of ionizing radiation, isotopes, recombinant DNA, and gene therapy.
GC 700	Intro to Neuroscience	Introduction to Neuroscience is a graduate lecture/seminar survey course which is designed to introduce students to basic concepts and experimental approaches to issues in the neurosciences. The course is divided into two integrated sections focusing on 1) Neurophysiology and Synaptic Transmission and 2) Neuroanatomy and Systems. An interdepartmental team of faculty will lead students through these topics with a series of lectures and discussions based upon assigned text readings and current journal articles.
GC 710	MD/PhD TranResearc Journal Club	
GC 712	MD/PhD TrResear Journa Club II	
GC 714	MD/PhD Tr Researc JournalClub III	
GC 720	Scientific Writing	This course concentrates on the process of writing the dissertation/thesis or research paper and on the effective presentation of scientific information. Students will learn to write the sections of a research paper or thesis and will develop skills with various pieces of productivity software such as word processors, spreadsheets, and statistical packages. Students will learn how to create sophisticated documents to improve the communication of scientific information. The course emphasizes a reader-oriented approach to writing, critical analysis of good biomedical writing, and strong presentation of data and ideas.
GC 721	Basic Writing Strategies OMFS	

GC 722	Honors Scientific Writing OMFS	
GC 725	Enrich Clinical Skills for Phys Science	The objective of this course is (1) to ensure the training and preparedness of MD/PhD students entering the clinical clerkship years of medical school, (2) to facilitate the transition from graduate school back into medical school, (3) to foster the continuance and enrichment of clinical skills during the graduate school years, and (4) to continue Thomas Jefferson University's reputation of exceptional and innovative medical education.
GC 730	Planning & Writing Research Grant	This course is designed to provide students with instruction and practical experience in the art of planning and writing a research grant proposal. Students will become familiar with the structure of a research grant, including the development of the major sections of a grant proposal such as specific aims, background and significance, and experimental design. Development of the experimental design section will include approaches to discussion of experimental rationale, detailed research methods, expected results and interpretations, and potential pitfalls and alternatives. Students will also learn about the peer review process and how to critique a grant proposal. NIH-style grants will serve as the model for this course, although the general principles of grant organization and writing will be applicable to all research grants. Students will gain practical experience by sequential production of three written documents: (1) an NIH-style Specific Aims Page, (2) a Research Plan based upon expansion and development of one specific aim, and (3) an NIH-style critique of a grant proposal.
GC 740	Principles of Pedagogy	Utilizing a combination of textbooks, journal articles, and case studies, the course is designed to expose students to important issues in the principles and practice of education, with a focus on higher education. The course will benefit those students engaged as teaching assistants as well as help to prepare them for careers where classroom education and/or other modes of teaching are involved. This course is designed for PhD students who have already passed their preliminary exams as well as post-doctoral fellows who are interested in pursuing careers that involve teaching. Prior or concurrent teaching experience is recommended, but not required.
GC 741	Principles of Science Pedagogy	Utilizing a combination of books, journals articles, and case studies, the course is designed to expose students to important issues in the principles and practice of education, with a focus o science higher education. The course will benefit those students engaged as teaching assistants as well as help to prepare them for careers where classroom education and/or other modes of teaching are involved.
GC 746	Principles of Onl Crs Des & Pedag I	
GC 747	Principles of Onl Crs Des & Pedag II	
GC 750	PhD Laboratory Rotation I	
GC 760	PhD Laborator Rotation II	
GC 770	PhD Laboratory Rotation III	
GC 780	PhD Laboratory Rotation IV	
GC 910	Research	
GC 920	Research	

GC 930	Research	
GC 940	Research	
GRADUATE INTERNSHIP		
GRIN 791F	Graduate Internship	Academic internships at Jefferson aid students in professional preparation through a work experience directly related to their major and career goals. Multiple credit registration options exist in 0.5 credit, 1 credit, 3 credit increments. All are completed as academic courses, including a course syllabus focused on professional skill-building and written assignments. While the primary emphasis on the course is on the internship work experience, course assignments are incorporated to prompt reflection. This reflection is an integral component of experiential learning and students' overall career and professional development. Graduate: . Students must maintain full-time status during the regular academic year International: . Meet criteria above as relevant . Determine if eligible for Curricular Practical Training (CPT) by contacting the office for International Student Programs Note: Students not meeting minimum requirements may be considered by submitting a formal appeal and should contact Career Services for further instructions.
GRIN 7910	Graduate Internship	Academic internships at Jefferson aid students in professional preparation through a work experience directly related to their major and career goals. Multiple credit registration options exist in 0.5 credit, 1 credit, 3 credit increments. All are completed as academic courses, including a course syllabus focused on professional skill-building and written assignments. While the primary emphasis on the course is on the internship work experience, course assignments are incorporated to prompt reflection. This reflection is an integral component of experiential learning and students' overall career and professional development. Graduate: . Students must maintain full-time status during the regular academic year International: . Meet criteria above as relevant . Determine if eligible for Curricular Practical Training (CPT) by contacting the office for International Student Programs Note: Students not meeting minimum requirements may be considered by submitting a formal appeal and should contact Career Services for further instructions.
GRIN 791Z	Graduate Internship	Academic internships at Jefferson aid students in professional preparation through a work experience directly related to their major and career goals. Multiple credit registration options exist in 0.5 credit, 1 credit, 3 credit increments. All are completed as academic courses, including a course syllabus focused on professional skill-building and written assignments. While the primary emphasis on the course is on the internship work experience, course assignments are incorporated to prompt reflection. This reflection is an integral component of experiential learning and students' overall career and professional development. Graduate: . Students must maintain full-time status during the regular academic year International: . Meet criteria above as relevant . Determine if eligible for Curricular Practical Training (CPT) by contacting the office for International Student Programs Note: Students not meeting minimum requirements may be considered by submitting a formal appeal and should contact Career Services for further instructions.
HAND & UPPER LIMB		
JCRS 750	Foundations in Hand Therapy	This course introduces the student to the specialized field of hand therapy. The principles of hand therapy included are musculoskeletal tissues and pathology, clinical reasoning, hand examination, principles of custom orthotic fabrication, therapeutic exercise, and interventions for pain, edema, and wound management. Common elbow, wrist, and hand disorders (e.g. hand/wrist fractures and tendinopathies) will be discussed to integrate the foundation topics into clinical practice.

JCRS 751	Nerve Injuries of the Hand and Upper Limb	This course emphasizes the anatomy and basic science principles for the cervical spine and major peripheral nerves of the upper limb. Age-related changes and pathophysiology of nerve lacerations and entrapment neuropathies are discussed. Advanced examination skills and interventions, conservative and post-operative, for pathology of the peripheral nervous system are presented.
JCRS 752	Joint Pathology of the Hand and Upper Limb	This course reviews the common pathologies that effect the articulations and surrounding soft tissues, especially tendons and ligaments. Anatomy, biomechanics, and examination principles for each region: shoulder, elbow, wrist, and hand are discussed. Conservative and post-operative therapeutic management for fractures, dislocations, tendon repairs, ligament injuries, and degenerative disorders are presented.
JCRS 753	Diseases That Affect the Hand and Upper Limb	Course content emphasizes the impact of disease on hand function, especially with activities of daily living, vocational activities, and recreational activities. The overview will include pathology, clinical presentation, examination techniques and clinical interventions specific to the hand. Additionally, multisystem involvement associated with complex hand injuries is discussed.
HEALTH COMMUNICATION DESIGN		
HCMD 501	Digital Imaging Fundamentals	This intensive course focuses on increasing the student's individual level of computer-aided design skills and literacy through the exploration of the fundamentals of both raster and vector-based software. Course projects provide hands-on experience with Adobe Photoshop and Adobe Illustrator software.
HCMD 502	Typography Foundations	This course will introduce typography to students through an examination of its history, technology, and usage. Practical applications of current typography software such as Adobe InDesign and Illustrator will be covered along other analog and digital typographic tools. The three-day course will include a series of lectures, exercises, and accumulate in one final project. Course content will have an emphasis on typography as it applies to people-centered communication systems and emerging tools and methods.
HCMD 600	Project Core—Design and Communication for Disease Prevention, Management and Cure	Ethical and inclusive problem-solving requires a human-centered approach, particularly when designing in the sensitive area of disease prevention, management and cure. This course will utilize research strategies, address communication dissemination challenges, and identify barriers to empowering change in the area of disease. Driven by this exploration, innovative solutions will be conceptualized, designed and prototyped. Individual and team projects will be undertaken. One project will be in the field.
HCMD 601	Topic Core—Design and Communication for Disease Prevention, Management and Cure	This course supports research and exploration of a health topic focused on disease prevention, management and cure through the lens of ethics and accessibility. Students will work both individually and in teams to explore different research methods including literature reviews, case/field studies, and interviewing. Students will also build ethically sound content and methods to pilot-test and evaluate with diverse end-users to better ensure access and inclusive practices. Lastly, students will engage in clear messaging and communication development to be designed in a companion studio course. Students will demonstrate a series of strategic research competencies in an area of disease awareness and communication, work within a team-based structure with a real-world client and apply their findings within the MS Health Communication Design Project Core Studio as the primary outcomes of this course.
HCMD 602	Communicating Health Data	Communication designers are challenged with representing data, ideas, and knowledge with clarity, precision and efficiency. Through both active studio learning and seminar content, this course explores processes and philosophies relevant to the creation of effective communication of complex data about human health using existing and emerging technologies.

HCMD 603	Change Management	This course provides an introduction to changing the behaviors of others. Through interactive in-person and virtual sessions, students will learn about overcoming resistance to change and designing strategies for changing behaviors at the individual, team and organizational levels. Throughout the course, students will work in small teams to apply what they are learning to an actual, on-going task they are working on together. By learning from their change project what does and does not work in a real-life situation, students will gain practical experience in trying to influence others to change their behaviors.
HCMD 604	Design Thinking Essentials	Design thinking is a methodology that uses human-centered research to drive innovation. This course emphasizes best practices for empathic human-centered research to inform opportunity framing, ideation, concept testing, an iterative process and collaboration. In this course, students will develop and refine abilities to construct, analyze and use the process of designing through the lens of design thinking. This course is not recommended for students who have taken the undergraduate courses Integrative Design Process or Innovation Essentials.
HCMD 605	Negotiations	This course is designed to foster learning through doing and to exploring students' talents, skills, and shortcomings as negotiators. Negotiation exercises will provide students with an opportunity to attempt strategies and tactics in a low-risk environment. Students will apply integrative and distributive negotiations techniques to evaluate the nature of the conflict and determine which negotiations techniques are best for resolving the conflict. Students will design negotiation strategies and apply them to effectively negotiate in one-on-one and team negotiations scenarios.
HCMD 606	Capstone Preparation	MS Health Communication Design students will create a Capstone Project as the culminating experience within the degree requirements. The Capstone Project is an independently defined and led project that requires in-depth study leading to multi-faceted output that draws from aspects of the full degree curriculum. This course will take the students through the process of identifying a topic, framing the opportunity to be addressed and finding resources to support execution of the project in the Capstone Project course to follow. Restrictions: students in MS degree program
HCMD 607	Topic Core—Design and Communication for Life Stages and Identity	Contextualized within the larger systems of public and economic health, this course will examine primary source equitable research and data as the basis for the development of audience-focused messaging. Individual life stages, identities, and the social determinants that impact health and wellbeing will be examined as part of the holistic human life cycle. Where and how we live, learn, work and play all influence healthy lives. Health communications will be developed and prototyped to address individuals and policymakers within the public sphere with global considerations. Individual and team projects will be undertaken. One project will be in the field. The course requires active participation in: lectures, readings, discussion, project development, teamwork, fieldwork, and presentations.
HCMD 608	Project Core—Design and Communication for Life Stages and Identity	Individual life stages and identities will be examined as part of the greater collective life cycle. Sustainable system design, in which responsive and equitable health and well-being are at the core, will drive health communication design responses to the public sphere of government, policymakers and global connectors. This course will utilize research and communication design strategies to deliver meaningful action-oriented design solutions that address life stage and identity challenges. Individual and team projects will be undertaken. One project will be in the field.
HCMD 609	Health and Package Design	Health and Package Design will provide students with the opportunity to investigate three-dimensional consumer-focused structures in the context of health-related messaging and goals. Students will explore implicit and explicit health messaging strategies in combination with the experience of interacting with a physical structure. Human-centered design research methods will be stressed throughout the development process. Sustainability, material selection, systemic impacts of the package design industry and the connection to human health will also be explored.

HCMD 610	Capstone	This course is the culminant experience for MS Health Communication Design students and provides the opportunity to build upon project framing work done previously in the Capstone Preparation course. Students will prototype, test and execute final deliverables in accordance with an independently defined project. The course structure brings together key learning about human-centered design and an iterative creative process in the context of designing communications for health topics. Restrictions: Pre-req of HCMD 600, HCMD 601, HCMD 607, and HCMD 608
HEALTH DATA SCIENCE		
HDS 500	Introduction to Data Management	Fundamentals of data management and programming using R. Students will begin programming in R and experience the science and art of Data Wrangling with various datasets.
HDS 501	Health Informatics & Analytics	Explores the vital roles of data, information, and information systems in the implementation and evaluation of Population Health initiatives, and Value-based Care initiatives. Reviews the various sources and types of data (clinical, financial, utilization, patient-generated, social determinants), techniques, and mechanisms bringing these data types together into a combined 'data asset that supports the Population Health initiatives. Addresses challenges, obstacles, and organizational approaches to creating this data asset, as well as regulatory and compliance requirements. Hands-on exercises provide real-life experience of working with health data. This course ends with a review of current software systems and applications in population health, extrapolating toward future Population Health Intelligence and Artificial Intelligence directions.
HDS 502	Advanced Data Analysis	Key programming techniques in data analysis such as exploratory data analysis and statistical modeling. The course requires ability to analyze data and program independently in R.
HDS 518	Data Science I	Applies computational and statistical techniques to address or gain insight into a real-world problem. Provides a comprehensive overview of data science, the practice of obtaining, modeling and interpreting data. Explores the process of how to structure applications of analytic methods for analyzing administrative, environmental, social, public health and clinical systems data. Introduces the data analytic process, which includes analytic planning, exploratory data analysis, multivariate statistical methods, statistical inference and practical interpretation of results.
HDS 519	Data Science II	R-based course that builds upon supervised learning algorithms and moves forward into unsupervised learning topics. Proficient R programming skills will be required to construct predictive models.
HDS 527	Analytics Leadership	This course prepares future leaders with expert knowledge and practical capabilities in the evaluation, selection, application and ongoing oversight of the best types of analytics to create learning healthcare systems that may result in continuously improving the demonstrable quality, safety and efficiency of healthcare organizations. The course addresses different types of traditional (descriptive, predictive and prescriptive) and more advanced types of analytics (including those deriving from the use of artificial intelligence and machine learning). Also addressed is the role of Chief Analytics Officers for their healthcare organizations to develop and discuss Clinical and Business Intelligence Plans.
PHI 532	Data Visualization	Explores the art of data visualization, communications, organizational psychology and change management with the goal of driving operational, tactical and strategic decision-making within healthcare organizations. Focuses on how to use data to a) provide knowledge in the most effective manner possible (i.e., provide relevant, timely and complete data to each audience member in a clear and understandable manner that conveys important meaning, is actionable and can affect understanding, behavior and decisions) and b) provide knowledge in the most efficient manner possible (i.e., minimize noise, complexity and unnecessary data or detail given each audience's needs and roles).

HDS 538	Implementation Science	Presents a multidisciplinary framework and methodology to promote the integration of scientific evidence into healthcare practice, policy and research. Addresses Implementation Science and the evaluation of evidence, stakeholder/organizational readiness, systems thinking, and approaches to implementation. Provides opportunities to develop design strategies, assess data needs, and complete a project implementation plan.
HDS 651	Capstone Research Project	Critically analyzes and develops proposals for HDS Capstone Projects. All parts of a proposal are drafted, critiqued, and revised in accordance with the Capstone Guidelines of the HDS program.
HDS 652	Strategic Capstone Portfolio & Presentation	Presentation of a portfolio of experiences in the degree program to demonstrate proficiencies in HDS core competencies.
HEALTH POLICY		
HPL 500	U.S. Healthcare Organization & Delivery	US Healthcare Organization & Delivery provides an overview of how health care is organized, delivered, and financed in the United States. The course traces the historical evolution in political, economic, and social contexts, including distribution and access to medical and other services, roles of public and private insurance for health care, and structure of healthcare benefits. Addresses current issues in US healthcare organization, delivery, and financing as well as policies and approaches that impact changes in healthcare delivery. HPL500 compares US organizations and delivery to systems and models used in other countries.
HPL 504	Health Law & Regulatory Issues	Provides a basic understanding of the foundational areas of Health Care law: Malpractice; reimbursement from Medicare/Medicaid/Private Insurance; the structure of health care entities; laws controlling Fraud, Abuse and Waste; and economic reform of Health Care. Addresses the study of case law, statutes and regulations, with an eye toward understanding how they support the public policy drivers of cost of health care, access to providers, quality of care, and patient choice. Lectures incorporate the practical application of the law in the healthcare professions. Weekly discussions and quizzes provide students the opportunity to demonstrate their understanding of the material and to discuss policy issues behind various legal concepts in health care. Discussions and assignments apply course materia to "real world" situations encountered in health care.
HPL 505	Legislative, Executive, and Regulatory Processes	<p>This course provides an overview of the U.S. health care system, including a foci on legislative, executive, and regulatory processes, health policy advocacy and the analysis as seen via the lens of the health professional. Students will critically apply real life health policy actions to the stages of public policy, as well as, the identification of relevant political strategies for a positive change in the local, state and/or national system of care. The course is focused around complex and interdependent policy challenges that allied health and medical professionals will face in the health system: ensuring access to health care, reducing costs, improving quality, addressing inequalities, transparency, and improving population health and value based care.</p> <p>Students will assess the regulatory and legislative health system demands and resources, while learning to analyze policy arguments, augment collaborative partnerships, evaluate evidence and research, and identify political strategies. Critical skills for engaging elected officials, professional organizations and consumers to address population health via policy analysis are integrated in the course.</p>

HPL 506	Health Policy: Analysis and Development from Health Policy	Prepares students to apply policy analysis tools to define and address health policy issues and problems. Examines the complexity of policy problems and provides the basic tools used in policy design, feasibility analysis, implementation and evaluation. Builds on prior coursework and incorporates stakeholder analysis and role of socio-cultural contexts, and economic, legal, and ethical perspectives in establishing a policy analysis framework. Addresses 1) how health policy is made and by whom; 2) the process of policy analysis and the vario
HPL 511	Policy Approaches to Addressing Social Determinants of Health	Examines the Social Determinants of Health (SDoH) descriptors outside of the traditional health care system and the innovative intersectoral policy approaches to address them. Explores funding options, such as Value-Based Payment Models, tobacco legislation, sin taxes, etc. Applies strategic intervention options at the community level.
HPL 512	Medicare and Medicaid	The course will provide students with a detailed understanding of the history, administration, financing, benefits, eligibility, and impact of the Medicare and Medicaid programs. Relationships between federal/state agencies and private insurance companies will also be explored. The programs will be examined to gain an understanding of their effectiveness and quality. Current debates and policy alternatives regarding the programs will be explored. Possible future scenarios for the programs will also be discussed.
HPL 513	Effective Communication and Dissemination of Data	Making evidence come to life through effective means of presenting data verbally and visually. Includes communication and dissemination strategies, effective oral presentation guidelines, optimal visual display of quantitative and qualitative data, and the use of media. This course will explore a variety of presentation styles to engage key stakeholder audiences. Both historic and current health topics will be used as examples to explore communication strategies and dissemination techniques.
HPL 515	Refugee & Migrant Health	In this course, students will examine the context of mass migration and immigration in countries around the world; the causes of population movement with specific emphasis on genocide, armed conflict, economic insecurity, and political oppression; unique population health needs of these populations; and cultural implications for research and practice.
HPL 516	Delivering Health Services in Resource-Limited Countries	In this course, students will examine the organization, financing, and delivery of health and healthcare services of developing and least developed countries around the world; review the history of myriad of global partnerships trying to improve population health in these areas; and evaluate the successes and failures of various population health improvement approaches in these countries.
HPL 520	Practice-Based Health Statistics	Introduces basics of descriptive and inferential statistics, including sampling, probability, and regression. The course will emphasize interpretation of statistical results, data management and generation of tables and graphs that can inform reports, evaluations, and quality improvement effort in the public health space. Applications include estimation of confidence intervals; testing statistical hypotheses for population means, proportions, and variances; and use of non-parametric tests. Utilizes MS Excel as a software tool to enter and analyze public health data. Uses Philadelphia regional data from the Public Health Management Corporation (PHMC) and CDC National Survey of Family Growth (NSFG) data as basis for student assignments.

HPL 550	Comparative Health Systems	This course provides in-depth exploration across a range of international health care systems. The intent is to compare, contrast and critically review international models of healthcare organization, management and delivery. During the course, frameworks and indices for the valid, reliable comparison of international health care systems will be identified and applied. A range of parameters will be analyzed and systematically evaluated- including quality, access, patient safety, efficiency, equity, healthy life expectancy, GDP healthcare costs and healthcare costs per capita. One key focus will be on applicability of international models to the US health care system and the identification of solutions for improvements in US healthcare system management and delivery.
HPL 650	Capstone Seminar & Project	Students develop capstone proposals in accordance with Capstone Guidelines for the health policy program.
HEALTH SCIENCES		
HSCI 610	Emergency Medical Technician	This hybrid course prepares students to handle emergencies using basic-life support equipment in accordance with objectives of the US Department of Transportation National Standard Curriculum. It includes training in American Heart Association (AHA) Basic Cardiac Life Support (BLS), and prepares students for the Pennsylvania Department of Health Emergency Medical Technician-Basic (EMT) examination process. Lab fee will be assessed. Enrollment restricted to 3+2 HSCI BS/Physician Assistant and HSCI BS/Pre-Physician Assistant majors.
HPS 600	Fundamentals of Applied Biostatistics	This course provides an overview of biostatistical methods, and gives students the knowledge and skills to perform, present, and interpret basic statistical analyses. Topics include basic descriptive statistics for collection, classification, and presentation of data; elements of probability; parametric and non-parametric estimation and hypothesis testing; analysis of variance within the context of specific types of experimental designs; regression modelling and survival analysis. The focus of the course is to develop students' ability to use statistical concepts for decision making and to critically interpret statistical results in popular and research articles.
HPS 601	Applied Health Research Design & Methods	The purpose of this course is to teach basic research skills and concepts needed to plan, conduct, and analyze data from a research project. Quantitative, qualitative, mixed method approaches to research will be introduced, as well as ethical issues in conducting research. Using the framework of the research project proposal, this course will focus on how to identify emerging research topics, state research objectives, perform scientific literature searches, derive variables, state hypotheses, develop an appropriate study design, and conduct basic statistical analyses.
HPS 602	Responsible Conduct of Research	This course will provide students with the opportunity to examine issues central to the responsible conduct of research (RCR) and develop strategies for navigating and preserving the integrity of the study environment. The course will tackle ten topics central to RCR: Plagiarism, Research Misconduct, Data Management, Authorship, Peer Review, Mentoring, Animal Subjects, Conflicts of Interest, Collaborative Research, and Human Subjects. Before each class meeting students will address each topic in individual Collaborative Institutional Training Initiative (CITI) modules that provide an introduction, supporting references that support further investigation, and a quiz. In corresponding synchronous sessions, topics will be explored by groups of students who will present a relevant current event, challenge questions, and lead a class discussion. Faculty preceptors will provide their perspective on the topic and discuss the impact on their careers with the class.

HPS 603	Health Systems Science	<p>This course will explore how health systems science functions as the third pillar of medical science, along with the basic and clinical sciences, by pursuing the understanding of how health care is delivered, how health care professionals work together to deliver that care, and how the health system can improve patient care and health care delivery. The course will investigate 12 topics integral to the study and improvement of health care including; an operational definition of the structure and goals of health systems science, systems thinking in health care, health care ethics, social determinants of health, health care policy and economics, value-based care, team-based care, patient safety, leadership, quality improvement, health care delivery systems, and improving population health. Students will gain a basic understanding of each topic by engaging with the 12 online AMA Health Systems Science Learning Series lessons. The companion quizzes facilitate assessment of understanding of the topic. Each topic will be further explored during synchronous online classes where a group of students will present a case study drawn from a recent academic paper, magazine or newspaper article, or web resource that links the relevant health systems science topic to a current problem in health care. Breakout groups will subsequently explore how the topic relates to a current health care challenge, propose an evidence-based approach from health systems science, and share the approach with the class during separate synchronous online sessions. Invited lecturers will share the most recent scholarship in specific areas of health systems science. The course will conclude with the Future Forum, where groups of students present preliminary plans for an interprofessional health delivery resource constructed using principles from health systems science.</p>
HPS 604	Scholarly Writing Foundations	<p>This practical writing course will teach graduate students the foundations of scholarly writing through both exposure and practice. They will explore different writing products and practice skills necessary to write with confidence.</p>
HPS 610	Simulation in Health Professions Education	<p>The modality and venue-set of simulation-based teaching of skills has become a major component of the skills required in the acquisition and maintenance of skills in health care students and professionals in practice. The learner will be introduced to and receive practical experience in the principles which underpin the development and production of high-quality, realistic and exportable simulation-based programs that translate to training at the bedside and in the clinical setting. The learner will have both didactic sessions with interactive experience-driven sessions in the state-of-the-art Jefferson University based Rector Clinical Skills and Simulation Center, under the tutelage of internationally known teachers in the field of clinical skills and the use of simulation in teaching. Overview of the best-practice in the utilization of standardized patient, task-trainer, virtual and hybrid-type simulation venues will be discussed and demonstrated. The teaching will be in an interdisciplinary manner; learners interested in this certificate will be from health care delivery and from health care administration disciplines.</p>
HPS 620	Foundations of Interprofessional Education (IPE) and Collaborative Practice (CP)	<p>Students will explore the rationale and evidence base for IPE/CP in health professions education and clinical practice using frameworks established by the World Health Organization, the Institute of Medicine (now National Academies of Medicine) and the Interprofessional Education Collaborative. Theories that underlie the need for and mechanisms to create effective IPE/CP will guide class discussions, team and individual activities, and assignments. Course materials will emphasize the importance of interprofessional individual identity and team development as part of the lifelong learning of all healthcare professionals and in continually improving the quality of care delivered to patients.</p>

HPS 701	Doctoral Project Foundation	This is the first course in the four-course Doctoral Project progression. The course provides a step-wise process for choosing a research topic, finding and reviewing the relevant literature, identifying a researchable question at the frontier of the field, and composing an abstract describing a hypothetical study, and its potential results and impact on the field. Students will formulate and compose multiple documents exploring research topic selection, literature review, and abstract generation. Development of these documents proceeds through a process of initial draft production, peer review, and final document preparation.
HPS 702	Doctoral Project Strategy	This is the second course in the four-course Doctoral Project progression. This course provides a step-wise process for composing an application to the Institutional Review Board (IRB) that will support the student's research study. These sections include Abstract, Specific Aims, Background and Significance, Preliminary Studies, Research Design and Methods, and Statistical Methods sections, with additional sections for studies involving human subjects. Students will formulate and compose each section as an individual document before assembling the documents into the final IRB application. Development of these documents proceeds through a process of initial draft production, peer review, and final document preparation.
HPS 703	Doctoral Project Execution	This is the third course in the four-course Doctoral Project progression. This course provides a step-wise process for executing the research project, including collecting and compiling study data, performing appropriate statistical analyses, assembling data and statistics into tables and figures, and formulating and composing a preliminary draft of a Results section that describes the application of the data to the specific aims of the project. Students will produce written documents for each step of the project execution sequence. Development of these documents proceeds through a process of initial draft production, peer review, and final document preparation.
HPS 704	Doctoral Project Strategy	This is the final course in the four-course Doctoral Project progression. This course provides a step-wise process for composing and presenting the final products of the DHSc scholarship course series; a manuscript suitable for submission to a peer-reviewed journal, and a poster for presentation at an academic conference. Students will formulate and compose drafts of each section of the manuscript before assembling the sections into a complete manuscript. Students will also produce and present a poster focused on the most important finding of their study. Development of these documents proceeds through a process of initial draft production, peer review, and final document preparation and presentation.
HEALTHCARE QUALITY & SAFETY		
HQS 500	Introduction to Healthcare Quality and Safety	Presents the student with the concepts of HealthCare Quality and Safety as horizontally and vertically integrated throughout the healthcare system. Provides models for demonstrating the association between quality and safety and healthcare economics, regulation, accreditation, organizational dynamics, professionalism and information technology and relates these concepts to population health.
HQS 502	Introduction to International Healthcare Quality & Safety	This course provides a general overview and specific details of healthcare quality, safety and value-based care across a range of international healthcare settings. As participants progress through this seven (7) week course, they will appraise healthcare quality and safety from an international vantage point. Real world, international best practice examples will be explored and appraised- including applications and methodologies for quality improvement, ethically allocating healthcare resources, reducing unwarranted clinical variability, tackling health inequities and improving access to value-based care.
HQS 505	Advanced Tools and Methods for Healthcare Quality and Safety	Integration of improvement science, complexity science, quality and safety tools and methodologies to develop systematic research designed to achieve sustained improvement in population healthcare delivery and outcomes.

HQS 507	Advanced Applications of HQS in Clinical Settings	Participants will complete independent and group work to develop evidence-based improvement plans for three cases that pose medical quality and safety challenges. Learnings from previous courses related to improvement tools, methods, change management, leadership, and data management will be synthesized to determine causes of problems in each scenario and offer recommendations for improvement interventions. Prerequisite(s): All courses in MS program except Capstone
HQS 508	Quality in Post Acute Care Settings	Current post-acute care CMS regulations require an organized, data driven approach to Healthcare Quality and Safety Programs with a focus on an organized framework for Performance Improvement and application of sound quality principles. This course will provide an overview of Healthcare Quality and Safety in the Post-Acute Care space. The focus will be on the scope of services and regulatory requirements for Skilled Nursing Facilities, Home Health and Hospice and public quality reporting. The course will elaborate on the data collection instruments and assessments that drive CMS Home Health Compare, Hospice Compare and Nursing Home Compare. The impact of quality metrics and reimbursement will be explored along with the Six Quality Aims and their application to improve Healthcare Quality and Safety across the healthcare continuum.
HQS 509	Applied Principles of Healthcare Quality	Establishes a basis for critical analysis of issues in healthcare quality and presents conceptual and scientific approaches to the evaluation of the structure, process, and outcome of quality improvement. Participants will apply their learning of Improvement Science, design measurement tools, and analyze quality outcomes through class participation and the development of case-based individual projects.
HQS 512	Business Case for Quality	This course examines each of the contributing factors necessary to develop and evaluate business cases for healthcare quality and safety improvement initiatives. Students will explore: 1) methods of identifying and calculating the cost of poor quality, 2) techniques for estimating the value of a proposed change, 3) barriers to achieving stakeholder buy-in, and 4) best practices for formally writing and presenting a business case.
HQS 515	Applied Principles of Patient Safety	Presents an overview of safety science, safety culture, and human factors engineering theories to provide a framework for a strategic application of safety tools and methods to promote and sustain safety in all healthcare settings. Offers an epidemiological approach to the study of medical errors as a public health issue.
HQS 516	Teaching Quality & Safety	In this course, students will examine the principles of effective adult-based education; evaluate strategies to increase learner satisfaction and knowledge retention; discuss how to implement a 'backwards design' curriculum development strategy for learners; and identify methods to assess learner satisfaction, knowledge attainment, and skill development. Students will also create a lesson plan for an educational program in Healthcare Quality & Safety
HQS 517	Teaching Health Systems Science	In this course, students will examine the principles of effective adult-based education; evaluate strategies to increase learner satisfaction and knowledge retention; discuss how to implement a 'backwards design' curriculum development strategy for learners; and identify methods to assess learner satisfaction, knowledge attainment, and skill development. Students will also create a lesson plan for an educational program in Health Systems Science.
HQS 650	Capstone Seminar and Project	Identification and development of a significant Healthcare Quality and Safety problem or research question for the Capstone Project. Critically analyzes healthcare quality and safety plans and protocols as developed by student participants.
HISTORIC PRESERVATION		

MHP 602	Uncovering the Past: Tools, Methods and Strategies	Buildings are silent witnesses to the Past. Rediscovering the “stories” of a building’s many lives relies upon piecing together archival, physical, and ethnographic evidence. This course affords in-depth study of the techniques, strategies and resources employed to track down data, using written, graphic, and oral sources. Field trips to key archival repositories provide students with first-hand experience in collecting and interpreting documentary evidence to develop historical narratives. Cross-listed ARST 302
MHP 603	Restoration and Rehabilitation of Modernism	Preservation of modern and mid-century modern buildings and sites is the next frontier within the profession as the significance of this architectural period is recognized and materials with which they were built reach the end of their serviceable lives. Working in track-based teams, students collaborate to determine historical significance and identify character-defining features of a building in the Philadelphia region, assess its condition, and prepare design solutions for adaptive reuse while preserving historic character. Cross-listed ARST 403
MHP 604	Conservation of Historic Building Interiors	Complementing the Building Conservation course this course provides a comprehensive overview of interior materials used in historic building interiors and the ongoing processes of their material deterioration, contemporary approaches to their treatment, and sustainability concepts of embodied energy and life cycle analysis as these pertain to building conservation. Through site visits, demonstrations, laboratory exercises, guided research, and discussions the course explores investigative techniques specific to historic interiors; diagnosis of existing conditions, including non-destructive and laboratory testing methods; and design of appropriate interventions to remedy observed problems. Students will collect, present, critically review findings and formulate recommendations for conservation and treatment of historic interior materials. Cross-listed ARST 404
MHP 605	Historic Preservation Thesis	The second in a two-term sequence, this course culminates in a thesis that demonstrates the student’s ability to formulate a viable, discipline specific hypothesis and conduct in-depth, original research. A thesis must expand the existing body of knowledge on the topic and introduce new ways of thinking, thereby contributing to the discourse in the field. Through the thesis project, the student demonstrates overall competency in principles, theory, practices and methodologies of Historic Preservation, accomplishment in a chosen area of specialization, as well as the acumen to perform independent research.
MHP 606	Historic Preservation Documentation: Photography	Begun in 1933, the Historic American Building Survey (HABS) is the first federal preservation program established to document America’s architectural heritage. In this course students learn the fundamentals of HABS documentation methods for the production of archival records of historic structures and places, utilizing the 4 x 5 large-format camera. Through field work and labs, students photograph, print, research and narrate comprehensive, technically proficient photographic essays that represent the salient aspects of historic structures, complexes and sites in accordance with HABS standards. Cross-listed POTO 436
MHP 620	Thesis Preparation	The first in a two-term sequence, this seminar guides students in the formulation of a research question tailored to the individual’s professional goals whose original analysis and proposed solution contributes to the discourse in the field. Avenues of inquiry within the discipline are wide-ranging, encompassing either research-based or design-driven topics, as determined by the student’s track. Working with both faculty and professional advisors, each student investigates current debates relative to the topic, significant case studies and core literature, in addition to topic-specific research strategies. Through the thesis project, students demonstrate overall competency in principles, theory, practices and methodologies of Historic Preservation, accomplishment in a chosen area of specialization, as well as the acumen to perform independent research.

MHP 621	Issues in Contemporary Preservation	Comprehensive analysis of preservation history, theories, policies, foundational principles and practices as applied to intersecting contemporary issues, namely preservation and sustainable design, adaptive reuse of historic buildings and sites, the role of preservation as a generator of urban revitalization and preservation planning paradigms. Topics are investigated from both micro and macro perspectives. Cross-listed ARST 221
MHP 622	Collaborative Preservation Project, Adaptive Reuse & Urban Regeneration	This Collaborative Project foregrounds preservation protocols on two intersecting scales—the micro level of adaptive reuse/design of an historic structure and the macro level of its urban environment. Working with a specific site and community-based client in the Philadelphia area, students engage in the process of adaptive reuse of historic buildings and the philosophical motives behind reuse, including the tenets of sustainable design, while also investigating preservation interventions as catalyst for urban regeneration. A primary focus of the Project is analysis of preservation strategies against the backdrop of the socio-economic and political contexts that impact a neighborhood's health and development. Cross-listed ARST 412
MHP 624	Architectural Forensics and Documentation	Students decode a building's past by deciphering and recording the physical evidence of its evolution. Students learn the fundamentals of professional field techniques used to document and interpret historic structures and places, utilizing sketching and technical drawing via hand drafting and computer modeling. Through field work and labs, students survey, sketch, draft, and annotate comprehensive, technically proficient drawings that represent the salient aspects of historic structures and sites. Procedures and techniques for analyzing historic buildings to determine original appearance and the nature, extent, and chronology of physical change which has occurred over their history are introduced. Cross-listed ARST 324
MHP 626	Building Conservation and Assessment	Through site visits, demonstrations, laboratory exercises, guided research, and discussions, this course provides a comprehensive overview of structural and exterior envelope materials used in historic buildings and the ongoing processes of their material deterioration, contemporary approaches to their treatment, and sustainability concepts of embodied energy and life cycle analysis as these pertain to building conservation. Topics include: investigative techniques for historic structures; diagnosing existing conditions, including non-destructive and laboratory testing methods; and designing appropriate interventions to remedy observed problems. Students will collect, present, critically review findings and formulate recommendations for conservation. Cross-listed ARST 266
HUMAN GENETICS		
HG 501	Intro to Genetic Counseling	
HG 502	Psychosocial Iss in Gen Couns	
HG 511	Gen Counseling Theory & Prac	
HG 512	Gen Couns Theory & Practice II	
HG 531	Gen Couns Workshop & Sem I	
HG 532	Gen Couns Workshop & Sem II	
HG 550	ClinApp for Genetic Counsel I	

HG 551	Clinical Applications II	
HG 552	Clinical Applications III	
HG 570	Res Des & Method for Gen Couns	
HG 580	Prac Issues in Gen Counseling	
HG 601	Medical Genetics	
HG 602	Medical Genetics II	
HG 611	Metabolic Genetics I	
HG 612	Metabolic Genetics II	
HG 637	Human Genetics	
HG 660	Ocular Genetics	
HG 670	Clin Cardiovascular Genetics	
HG 680	Clinical Cancer Genetics	
HG 690	Gen Basis of Neur & Psych Dis	
HG 701	GenCounseling Lab/FieldRotatio	
HG 702	Clinical/Lab Rotation	
HG 703	Clinical/Lab Rotation	
HG 704	Clinical/Lab Rotation	
HG 705	Clinical/Lab Rotation	

HG 706	Clinical/Lab Rotation	
HG 801	Thesis I	
HG 802	Thesis II	
HG 803	Thesis III	
INDUSTRIAL DESIGN FOUNDATION		
IDF 500	Drawing: Design & Development	This is an advanced drawing course developed for designers of all disciplines who want to improve the designer's ability to apply knowledge imparted in other courses to the development of designs. Wherever possible the subject matter of the students' design studio courses will be used as the subject matter for drawing exercises.
IDF 502	Foundation in Web Design & Strategy	This course will focus on the principles of raster and vector electronic imaging as a means to provide a solid foundation needed to succeed in the digital design field. This is a lab-based class with specific instruction in Adobe Photoshop and Adobe Illustrator. This is a foundation course that does not count for credit toward the graduate degree.
IDF 503	Electronic Communications Seminar I	Theory of Electronic Communication I This course introduces students to the theoretical understanding of the role of the interactive designer. Special focus will be placed on how our existing culture has been, and is currently being, revolutionized by the information revolution. This is a foundation course that does not count for credit toward the graduate degree.
IDF 505	Mat & Proc Manufacturing	This course is concerned with the exploration of materials used in the mass production of products, the processes used to shape these materials and the applicability of these materials to product-design solutions. Students should be prepared to visit a number of manufacturing facilities. A survey of rapid prototyping technologies completes the course.
IDF 506	Application Software	Application Software Using Windows and Mac platforms, this foundation course will focus on experiences which will familiarize students with instructional applications productivity uses of microcomputers. Word processing, database management, spreadsheets, graphic tools and telecommunications will be analyzed in terms of their application to business and education. The skills presented in this course are prerequisites for all other courses offered in the Instructional Design and Technology program. This is a foundation course that does not count for credit toward the graduate degree.
IDF 507	Design I for Industrial Design	This studio is an introduction to design for undergraduate majors in industrial design. The course will provide an intensive introduction to design as an iterative problem-solving process. It will also introduce strategies for making and analyzing form, and present basic techniques of two-dimensional visualization and documentation of three-dimensional objects and principles of design critique, testing and research.
IDF 508	Materials & Processes Fab	This course introduces shop techniques as they pertain to industrial design model-making and prototype construction. All industrial design students must take this course for shop equipment safety training and pass a safety test. Throughout the semester, attention is given to safety precautions for the shop, along with demonstrations of shop equipment and fabrication processes. A major portion of the course will consist of developing an understanding of the materials and machinery commonly used by industrial designers for producing both working and appearance models.

IDF 509	Rendering for Indust Design	An introduction to the traditional techniques and materials that industrial designers use to develop and represent threedimensional concepts and ideas. Students become proficient in the use of pencils, markers, pastels and airbrush on a variety of media. Emphasis is placed on understanding the significance of color and graphic applications for industrial design.
IDF 510	Ergonomic Studies	This course analyzes human factors as related to broad aspects of design development. It explores the issues of operator/ user human factors and their impact on design. The outcome of this course will be to ascertain the relationship of basic human dimensions on product design. Subjects include systems reliability, sensory and motor processes, basic research techniques and anthropometric studies.
IDF 511	Interactive Design III	This studio will explore the translation of the three- and fourdimensional concepts into two-dimensional screen images, interactivity and animation. Students will be introduced to the theory and practice of motion graphic production. The mediums of choreography, filmmaking, architecture, performance art, and music will be discussed as potential sources of inspiration for creating new and powerful forms of digital space and experience. A series of increasingly complex projects will culminate in a more demanding final project.
IDF 512	Interactive Design IV	Digital Design IV This studio will develop the ability of the digital designer to successfully participate within an interdisciplinary team. Students from a variety of majors will work together to develop a final, working prototype of a product, service, experience or publication of their choice that synthesizes their knowledge and skills from the previous studios. The students will develop a final project that demonstrates marketability and successfully functions within the larger community. This is a foundation course that does not count for credit toward the graduate degree.
IDF 513	Design V for Industrial Design	The fifth in a series of eight studios, this course focuses on ideas of designs derived from an understanding of consumer behavior. Emphasis is placed on user needs, ease of use and product culture, without ignoring the practicalities imposed by manufacturer's markets, manufacturing process constraints and investment concerns. Students will demonstrate control of the process of design to develop meaningful concepts that employ appropriate technology for their eventual realization.
IDF 514	Drawing Essentials	This drawing course emphasizes the understanding of space and alternative approaches for recording and expressing it. Much information in regard to drawing practice will be accumulated during this semester such as mark making skills, developing sensitivity to light and shade, experimentation with media and the use of color as an introduction to figure drawing. *This course should not be taken by students who have received credit for DRAW 101 or DRAW 201 in the School of Design & Engineering or the School of Architecture*
IDF 515	Design VI for Industrial Dsign	In this sixth of a series of eight studio courses, students design and develop consumer products. Students learn about the complexities of the product-development process, during which assembly requirements, marketing issues, materials and component development all affect the initial intent of their designs. Students are required to fabricate a fully functional prototype of their designs. A selected team of professionals from the industry will evaluate the final product.
INTEGRATIVE HEALTH EDUCATION		
IHE 600	Foundations in Integrative Health Education	This first course provides the necessary framework for understanding integrative health education in the transformation of healthcare. A review of integrative health topics/modalities combined with an introduction to psychological, motivational, and behavioral theories and strategies; communication strategies; and basic health education principles and techniques that influence health and wellness will be covered in this course

IHE 610	Integrative Developmental Model for Wellness and Leadership	In this second course, participants will explore health education considerations and strategies for wellness and various clinical conditions with a focus on optimal integrative health outcomes. Through case-based learning and practice, instructor and peer-evaluation, and reflection, participants will apply advanced motivational interviewing techniques, the use of positive psychology and other strategies to effect behavioral change, and individualized goal setting and integrative program planning for a variety of patient/client conditions. Utilizing evidence-based resources to meet the needs of clients with specific clinical conditions is a critical component for successful client education
IHE 620	Integrative Health Education Practicum	This practicum course includes a combination of participant-generated and course-related case-based teaching and learning activities. Participants will apply evidence-based education practices for healthy living and clinical conditions through recorded and live-virtual case presentations of client interactions for self-reflection, peer feedback, and faculty mentoring. Participants will demonstrate their ability to utilize a range of Integrative Health Education knowledge, skills, and processes, especially when encountering challenging education situations
IHE 700	Integrative Health Master's Program Capstone	This is the culminating course in the Integrative Health Master's Program designed to enable students to demonstrate master's level research, critical thinking, writing, and presentation skills. Participants will develop an evidence-based integrative health education plan or wellness program for a patient/client that includes some combination of integrative nutrition and mind-body medicine practices. This will include data collection and analysis and a written patient/client plan or program for a patient/client.
I MBA (ON-CAMPUS)		
IMBF 503	Foundations of Economic Analysis	This course introduces students to basic microeconomic and macroeconomic concepts including supply and demand, economic indicators, labor economics, international trade, and fiscal and monetary policy. The course focuses on the relevance of these concepts for organizations and organizational decision-making.
IMBF 504	Intro to Financial & Managerial Accounting	This course is designed to introduce students to the fundamentals of financial and managerial accounting. Accounting information is discussed as a basis for planning, control and managerial decision-making.
IMBF 505	Financial Management	This introductory level finance course examines the role of financial decision-makers at the corporate level. Emphasis is placed on the goals of the firm, efficient market hypothesis, discounted cash flow analysis, and the trade-off between risk and return.
IMBF 508	Statistical Analysis for Business Decisions	This is a foundations course in Statistics for the MBA program. Descriptive statistical measures and probability theory are combined to provide the basis for statistical decision-making techniques. Areas covered include: measures of central tendency, measures of variability, hypothesis testing and confidence intervals, one- and two-way analysis of variance, Chi-squares and non-parametric statistical techniques.
IMBF 510	Operations Management	This introductory level course provides students with an understanding of the latest quantitative tools for corporate decision-making. Topics include quality-control applications, optimization techniques (including linear programming), the simplex method, the transportation model, and the assignment model. Other topics include time-series analysis, queuing theory and an introduction to total quality management. Computer applications, case analysis and problem-solving sets are used throughout the course.
I MBA (ON-LINE)		
IMFX 503	Foundations of Economics	This course introduces students to basic microeconomic and macroeconomic concepts including supply and demand, economic indicators, labor economics, international trade, and fiscal and monetary policy. The course focuses on the relevance of these concepts for organizations and organizational decision-making.

IMFX 504	Intro to Financial & Managerial Accounting	This course is designed to introduce students to the fundamentals of financial and managerial accounting. Accounting information is discussed as a basis for planning, control and managerial decision-making.
IMFX 505	Financial Management	This introductory level finance course examines the role of financial decision-makers at the corporate level. Emphasis is placed on the goals of the firm, efficient market hypothesis, discounted cash flow analysis, and the trade-off between risk and return.
IMFX 508	Statistical Analysis for Business Decisions	This is a foundations course in Statistics for the MBA program. Descriptive statistical measures and probability theory are combined to provide the basis for statistical decision-making techniques. Areas covered include: measures of central tendency, measures of variability, hypothesis testing and confidence intervals, one- and two-way analysis of variance, Chi-squares and non-parametric statistical techniques.
IMFX 510	Operations Management	This introductory level course provides students with an understanding of the latest quantitative tools for corporate decision-making. Topics include quality-control applications, optimization techniques (including linear programming), the simplex method, the transportation model, and the assignment model. Other topics include time-series analysis, queuing theory and an introduction to total quality management. Computer applications, case analysis and problem-solving sets are used throughout the course.
IMMUNOLOGY		
IM 505	Fundamen of Immunology	A comprehensive course encompassing the major areas of Immunology: 1) the cells and organs of the immune system; 2) nature of antigens, antibodies, and receptors; 3) lymphocyte activation, proliferation, and differentiation; 4) the major histocompatibility complex; 5) regulation of the immune response; 6) effector mechanisms of immunity; and 7) immunologic mechanisms in disease. The format will involve both lecture and discussion of specific topics, and students will be encouraged to acquire an understanding of classical and modern immunological concepts through analysis of their experimental bases. Discussion of critical techniques in Immunology will be incorporated throughout the course. Assigned reading.
IM 523	Parasite Immunology	Discussions will be focused on the immune response to parasites. Emphasis will be given to how parasites of man are eliminated from immune hosts and to the mechanisms parasites employ to evade the immune response.
IM 530	Infection and Immunity	This course provides students with an introduction to the field of microbial immunology. Lectures will focus on particular infectious agents and will discuss how the immune response reacts to the organisms and what the organisms do to evade immune-mediated elimination. Organisms ranging from viruses through bacteria to protozoa, helminths, and arthropods will be studied.
IM 610	Res Rotation-Immunol I	Students spend time in laboratories of program faculty, discussing the ongoing research projects and conducting experiments. Students are encouraged to read the background literature for the research area and to begin to develop approaches to the problem. These rotations are a prelude to selection of a research advisor.
IM 620	Res Rotation-Immunol II	Students spend time in laboratories of program faculty, discussing the ongoing research projects and conducting experiments. Students are encouraged to read the background literature for the research area and to begin to develop approaches to the problem. These rotations are a prelude to selection of a research advisor.

IM 622	Tumor Immunology	This course is intended to give the student an in-depth analysis of how tumors develop and interact with the immune system. Oncogenes and leukemogenesis will be discussed along with our current understanding of tumor antigens. The cellular and humoral basis for generating immune responses to tumor challenge will be studied along with the theoretical background and experimental findings to support modern approaches of immunotherapy. Topics will be studied by lecture and discussion of reading assignments.
IM 623	Immuno-pathology	In-depth analysis of current research in transplantation immunology, neuroimmunology, and reproductive immunology. Student presentation and discussion of literature.
IM 630	Res Rotation- Immunology III	Students spend time in laboratories of program faculty, discussing the ongoing research projects and conducting experiments. Students are encouraged to read the background literature for the research area and to begin to develop approaches to the problem. These rotations are a prelude to selection of a research advisor.
IM 631	Advanced Cellular Immunology	Current concepts and controversies in ontogeny, molecular and cellular interactions, activation and regulation of normal and defective immune responses. Primarily discussion of current literature.
IM 632	Molecular IM/ Immunogenetics	This course concentrates on the molecular and genetic basis for lymphocyte receptor signal transduction, activation, and maturation. Emphasis will also be placed on the role of cytokines and interaction molecules for antigen recognition and cytotoxic mechanisms. The immunogenetics of MHC and non-MHC molecules and their impact upon immune responses will also be discussed. Through assigned reading and discussion of notable scientific literature in these areas, students will gain a basic understanding of the current concepts.
IM 712	Curr Lit in Immunology I	A weekly presentation and discussion of recent literature in Immunology for students and faculty. Students will present on a rotating basis and are encouraged to participate in the general discussion.
IM 722	Curr Lit in Immunology II	A weekly presentation and discussion of recent literature in Immunology for students and faculty. Students will present on a rotating basis and are encouraged to participate in the general discussion.
IM 732	Current Literature in Immuno III	A weekly presentation and discussion of recent literature in Immunology for students and faculty. Students will present on a rotating basis and are encouraged to participate in the general discussion.
IM 910	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
IM 920	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
IM 930	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.

IMMUNOLOGY & MICROBIAL PATHOGENS		
IMP 505	Fundamentals in Immunology	A comprehensive course encompassing the major areas of immunology: 1) the cells and organs of the immune system, 2) nature of antigens, antibodies, and receptors, 3) lymphocyte activation, proliferation, and differentiation, 4) the major histocompatibility complex, 5) regulation of the immune response; 6) effector mechanisms of immunity and 7) immunologic mechanisms in disease. The format will involve both lecture and discussion of specific topics, and students will be encouraged to acquire an understanding of classical and modern immunological concepts through analysis of their experimental bases. Discussion of critical techniques in Immunology will be incorporated throughout the course. Assigned reading.
IMP 505A	Fundamentals of Immunology	A comprehensive 6 week course encompassing the major areas of Immunology. Part A: Innate immunity, immune receptor diversity; antigen processing and presentation; T and B cells. The format will involve both lecture and discussion of specific topics, and students will be encouraged to acquire an understanding of classical and modern immunological concepts through analysis of their experimental bases. Discussion of critical techniques in Immunology will be incorporated throughout the course. Assigned reading.
IMP 505 B	Advanced Fundamentals of Immunology	A comprehensive 6 week course encompassing the major areas of Immunology. Part B: Immune tolerance, microbial immunity; transplantation; tumor immunology. The format will involve both lecture and discussion of specific topics, and students will be encouraged to acquire an understanding of classical and modern immunological concepts through analysis of experimental bases. Discussion of critical techniques in Immunology will be incorporated throughout the course. Assigned reading. Prerequisite: IMP 505A
IMP 530	Infection & Immunity	IMP 530 is a highly interactive course. The goals of this course are to increase students' knowledge about infection, immunity, and host-pathogen interactions; practice teaching various topics of microbiology and immunology; discuss their ideas with other students; and gain some experience writing short scientific articles in a style accessible to a broad audience. With these goals in mind and under close guidance and mentoring by the course directors and instructors, students will give lectures to their classmates, debate with their peers outstanding controversies in the field, and write and present short articles summarizing the importance and caveats of recent high impact papers.
IMP 600	Virology	This course provides students with an introduction to the field of Microbiology. Lectures will focus on particular infectious agents and will discuss pathogenesis, immunology, physiology, cell biology, pharmacology, and molecular biology of these organisms.
IMP 600A	Bacteriology Mycology & Parasitology	
IMP 600B	Virology	
IMP 601	Pre-Entry Rotation	
IMP 605	AdvCellular/Molecul Immunology	The objective of this course is three-fold. (1) To study advanced cellular and molecular aspects of the innate and adaptive immune system, based on the foundation provided in IMP 505. Topics covered will include immune cell development-differentiation, antigen presentation and recognition, antigen receptor and cytokine receptor signaling transduction, effector mechanisms, memory development, and regulation of immune responses. (2) To gain understanding of current concepts through discussion of experimental logistics found in the assigned representative literature. (3) To begin to learn also to write research and review papers by writing a paper on one of the topics covered in the classes, using as examples the papers read and discussed in class.

IMP 610	Research Rotation in IMP I	Students spend time in laboratories of program faculty, discussing the ongoing research projects and conducting experiments. Students are encouraged to read the background literature for the research area and to begin to develop approaches to the problem. These rotations are a prelude to selection of a research advisor.
IMP 613	Retroviruses	The goal of this course is to provide information about retroviruses as the biological and molecular level. Retroviruses have been extensively used as model systems to understand the process involved in oncogenesis. The discovery of retroviruses associated with human diseases and the possibility of using retroviruses as gene therapy vector further stimulated research on retroviruses in the last 25 years. A major thrust of this course is to stimulate thinking about retroviruses from an experimental, therapeutic and diagnostic point of view. We hope the students will leave with a solid foundation which will enable them to learn more on their own.
IMP 620	Research Rotation In IMP II	Students spend time in laboratories of program faculty, discussing the ongoing research projects and conducting experiments. Students are encouraged to read the background literature for the research area and to begin to develop approaches to the problem. These rotations are a prelude to selection of a research advisor.
IMP 622	Tumor Immunology	This course is intended to give the student an indepth analysis of how tumors develop and interact with the immune system. Oncogenes and leukemogenesis will be discussed along with our current understanding of tumor antigens. The cellular and humoral basis for generating immune responses to tumor challenge will be studied along with the theoretical background and experimental findings to support modern approaches in immunotherapy. Topics will be studied by lecture and discussion of reading assignments.
IMP 623	Immuno-pathology	Indepth analysis of current research in transplant immunology, neuro-immunology, viral immunopathology, and reproductive immunology. Student presentation and discussion of literature.
IMP 630	Research Rotation in IMP III	Students spend time in laboratories of program faculty, discussing the ongoing research projects and conducting experiments. Students are encouraged to read the background literature for the research area and to begin to develop approaches to the problem. These rotations are a prelude to selection of a research advisor.
IMP 631	Advanced Cellular Immunology	Current concepts and controversies in ontogeny, cellular interactions, activation and regulation of normal and defective immune responses. Primarily discussion of current literature.
IMP 632	Molecular Immunology & Immunogenetics	This course concentrates on the molecular and genetic basis of lymphocyte receptor signal transduction, activation, and maturation. Emphasis will also be placed on the role of cytokines and interaction molecules for antigen recognition and cytotoxic mechanisms. The immunogenetics of MHC and non MHC molecules and their impact upon immune responses will also be discussed. Through assigned reading and discussion of notable scientific literature in these areas, students will gain an understanding of the current concepts.
IMP 645	Advanced Cellular & Molecular Immunology	
IMP 655	Advanced Topics in Microbial Pathogen	This advanced course will present examples of how pathogens cause disease in their hosts and emphasize the molecular mechanisms of pathogenesis for the three major types of microbial pathogens: bacteria, parasites, and viruses. Basic course work in Microbiology, Immunology, and Cell Biology is a prerequisite for this course.

IMP 685	Advanced Topics in Virolog Neurovirology	This is an advanced course presenting new research findings in the areas of Molecular Virology and Neurovirology and requires basic course work in Microbiology, Immunology, Genetics, and Biochemistry. Topics include important human viral pathogens such as HIV, influenza-, rabies-, and measles virus. The purpose of this course is to highlight recent insights into the mechanisms of viral infection and resulting pathology.
IMP 710	Seminar in Micro & Immunology	
IMP 712	Current Literature in IMP I	A weekly presentation and discussion of recent literature in Immunology for students and faculty. Students will present on a rotating basis and are encouraged to participate in the general discussion.
IMP 720	Seminar	This course exposes students to current topics in immunology and microbial pathogenesis by participation in the weekly seminars of the Department of Microbiology and Immunology which include oral presentations by Jefferson Faculty, presentations by invited speakers from outside the University, and research in progress presentations by upper level PhD students and postdoctoral trainees. IMP students in the 3rd year of study and beyond are required to make annual presentations in the research in progress seminars. This seminar series is an excellent forum for students with interests in immunology and microbial pathogenesis to be exposed to a diverse range of topics, to observe experienced presenters, and network with TJU scientists as well as invited speakers.
IMP 722	Current Literature in IMP II	A weekly presentation and discussion of recent literature in Immunology for students and faculty. Students will present on a rotating basis and are encouraged to participate in the general discussion.
IMP 730	Seminar	This course exposes students to current topics in immunology and microbial pathogenesis by participation in the weekly seminars of the Department of Microbiology and Immunology which include oral presentations by Jefferson faculty, presentations by invited speakers from outside the University, and research in progress presentations by upper level PhD students and postdoctoral trainees. IMP students in the 3rd year of study and beyond are required to make annual presentations in the research in progress in progress seminars. This seminar series is an excellent forum for students with interests in immunology and microbial pathogenesis to be exposed to a diverse range of topics, to observe experienced presenters, and network with TJU scientists as well as invited speakers.
IMP 732	Current Literature in IMP III	A weekly presentation and discussion of recent literature in Immunology for students and faculty. Students will present on a rotating basis and are encouraged to participate in the general discussion.
IMP 910	IMP Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn reserach design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the students time and attention.
IMP 920	IMP Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn reserach design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the students time and attention.

IMP 930	IMP Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn reserach design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the students time and attention.
IMP 940	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn reserach design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the students time and attention.
INDUSTRIAL DESIGN		
INDD 500	Skills & Methods for Industrial Design	An intensive summer workshop for graduate students matriculating without an industrial design background. This course replicates much of the skills-based content covered in undergraduate Design I, and goes on to cover shop and prototyping issues otherwise found in Materials and Process: Shop Techniques, as well as basic materials and process selection for manufacturing. Projects are designed, but this class focuses on techniques and skills rather than the objects designed.
INDD 600A	Intercultural Innovation: Study Abroad Component	During a short experience in a foreign country, students will observe and document cultural and demographic difference between countries through formal lectures, and field observations and team exercises. The work in this class is informed by the use of user-based observational research techniques, which students will adapt and propose. Documentation is brought back to the US for use in the MSID-600B Intercultural Innovation: Interdisciplinary Project Component class. Students should plan on taking BOTH classes.
INDD 600B	Intercultural Innovation: Project Component	This is the second in a two-course interdisciplinary course sequence. This class builds on work done in the MSID-600A Intercultural Innovation: Study Abroad Component course. Students should plan on taking BOTH classes. In MSID-600B, students bring research by interdisciplinary teams outside the US into well-documented opportunities for new products, business platforms or systems. In a series of team meetings and design critiques, they then turn them into cohesive proposals including both design and business elements.
INDD 700	Research & Design Process Methods	This course gives students the tools they need to find and frame opportunities, to construct successful design briefs and to evaluate design in progress, and to explore and document new generative and evaluative research techniques and defining basics of professional practice. class projects will support studio work, as well as contributing to ongoing research initiatives.
INDD 701	Design Business & Entrepreneurship	This course addresses specialized topics in professional practice relevant to graduate industrial and user experience design students. These include current approaches to intellectual property, professional ethics, business model analysis, contracts, management practices, and structures of practice and employment in the field. In addition, students research fields to identify potential career paths, and plan and execute individual strategies for networking and interviewing.
INDD 703	User Centered Design	This course is the first in the MSID studio sequence. This studio concentrates on user-centered design techniques, including observational/ethnographic research methods and methods incorporating users and other stakeholders into the design process. Each studio will be expected to do extensive generative research and to publicize/archive its research and conclusions.

INDD 704	Wkshop: Interactive Prototypn	This course addresses the need by industrial design professionals to create interactive, intelligent systems comprising both hardware and software components, and to test, iterate, assess and defend these solutions based on principles of cognitive and physical human factors. Through quick, iterative prototyping and testing of interfaces based on simple microcontrollers, this class teaches basic programming, integration of electronic sensors and outputs into tangible interfaces, and principles of testing and cognitive ergonomics for use in assessment of interactive interfaces.
INDD 705	Collaborative Innovation Studio	This course is the second in the MSID studio sequence. This studio provokes interdisciplinary activity through projects centered on designed systems, which require industrial design but require inputs from other disciplines and stakeholders as well.
INDD 707	Current Issues in Industrial Design	In this class, students map and discuss the major influences on industrial design today, as well as modeling the lifetime learning and assessment of theory that are necessary for effective professional design and critique. The class is a seminar and is thematic rather than historical in focus. The reading list is expected to include blogs and periodicals, as well as books, and will change frequently.
INDD 791	Internship	This course allows students to pursue direct experience in a company or organization that is actively engaged in design-related work. Students augment and enrich their overall education at the University by learning through direct work experience on design projects. Permission required, see program director or Career Services office for details.
INDD 798	Independent Study	This course will allow students to pursue individual areas of interest while working jointly with a faculty member. Enrollment is subject to the availability and approval of both the program director and faculty member. The student must have 18 or more graduate-level credits, and a prospectus of the proposed independent study must be approved at least one month prior to registration. See appropriate form available online at Registrar's website, www.philau.edu/registrar/ .
INDD 803	Master's Project I: Implementation	The 2-semester capstone project sequence stresses the importance of iterative prototyping and evaluation in current design practice by devoting two semesters to the ID Capstone project. In this first capstone project semester, students begin work with a team of collaborators within and outside the University. Students have weekly progress critiques with studio faculty and other students, as well as regular meetings with outside project stakeholders. The semester concludes in a progress presentation with outside critics.
INDD 804	Master's Project 2: Development & Evaluation	The MSID master's project sequence includes two courses. In this second semester, students work with collaborators and critics/clients within and outside the University to develop, detail and revise designs to a professional level, and to test their performance in the real world. Activities include weekly critiques with studio faculty and other students, as well as meetings with outside project stakeholders. The semester concludes with in-person defense of the work and a display at the CDEC Spring Design Show.
INNOVATOR MBA (ON-CAMPUS)		
IMBA 600	Management Concepts	This course introduces students to the theory and practice of managerial functions and decision-making models in traditional and more innovative organizations. Students are familiarized with the importance of organizational communications, including verbal and written communications and the criticality of using multiple communication channels. Students explore basic negotiation techniques and methods of conflict resolution.

IMBA 601	Marketing Concepts	This course provides students with a broad understanding of the various organizational marketing functions including the development, positioning, pricing, distribution, and promotion of products, services, and business ideas. Attention is focused on understanding of the basic marketing concepts including strategic planning, marketing mix, market segmentation, branding, consumer research, and marketing research and applying the knowledge to formulate marketing strategies for business opportunities.
IMBA 602	Managing Innovative People & Teams	Managing Innovative People and Teams This course addresses the skills and attitudes that support leadership in complex, innovative organizations under conditions of uncertainty and change. Students will explore the concept of self-leadership, managing change, ethical decision-making, power and influence, motivation, facilitation of diverse teams, conflict resolution, and organizational culture. The course begins with creative exercises in leadership style self-assessment and relates these results to leadership in new, innovative organizational structures.
IMBA 604	Business Model Innovation	In this course students fully explore how an organization creates, delivers, and captures value through a customer-centric approach to business model innovation. The impact of industry disruption through business model innovation will be explored as students analyze and evaluate existing models. Using creative thinking and specific patterns, students will gain experience in planning and executing new models to address the complex challenges facing businesses from a variety of industries in the market place today.
IMBA 625	Communication, Negotiation Creative Economy	This course covers the concepts and art of effective management communications and negotiations in the business environment. The total communications process ? verbal, nonverbal, presentation, written and electronic ? is reviewed in the context of today?s work environment. The perspectives and needs of top management, interactive teams, individual contributors, and clients are examined and translated into professional practices. Experiential exercises and class discussions will build participants? understanding of styles and skills in negotiating. Coursework will focus on the uses of power, influence, and negotiating styles, methods of conflict resolution and means of influencing others.
IMBA 627	Competitive Tech Intelligence	This course will focus on the latest technological advances for managing data and communications effectively. Students will acquire the skills and concepts necessary to use a system to handle data efficiently for large and small organizations, national or international in scope. Network technology and usage of computer networks, as well as ethical and security issues will also be addressed. The concepts of telecommunications and the costs and benefits associated with this transmission of information will be explored. Methods of instruction include hands-on/application orientation.
IMBA 628	Accounting for Management Decisions	This course provides students previously exposed to financial and managerial accounting principles an opportunity to study the structure and use of accounting systems designed to aid management in controlling costs and profits. The course stresses the following: financial statement interpretation as a basis for decision making, cash flow analysis, cash budgeting, cost volume profit analysis, costing and interpretation of manufacturing systems and the impact of international competition, responsibility accounting and the impact of inflation.
IMBA 629	Financial Policy and Planning	This course focuses on the investment and financing decisions of firms. Topics include capital budgeting, cash management and cash flow analysis, capital structure, dividends and international operations. Financial policy making is considered within the context of contemporary valuation and risk management theories. Various financial planning models are analyzed in the course.

IMBA 630	Operations Systems Perspective	This course will focus on the mathematical models and methods available for use in formulating and analyzing business decision-making problems in industry. Areas of study include: probability theory, decision analysis, game theory, forecasting techniques, project management, queuing models, allocating scarce resources using linear programming and integer-programming techniques, and deterministic and probabilistic inventory models.
IMBA 642	Strategic Insight & Implementation	This course explores the strategic visioning, planning and implementation process, with a focus on global industries and the challenges faced by businesses in an increasingly dynamic environment. Students analyze strategic threats and opportunities that confront businesses across the globe in the 21st century.
IMBA 700	International Economic and Finance	This course explores interrelationships between economic growth/development theories and financial applications in global markets, emphasizing international financial management techniques and practices. Topics include international trade, balance of payments, foreign exchange markets and risk, the international financial system, and portfolio effects of capital budgets on international capital markets. Students explore current issues of concern to multinational firms such as environmental problems, organizing for optimal results, sources and uses of funds, and accounting, tax, and control issues.
IMBA 714	New Product Development	This project-based, team oriented course provides a methodology for discovering and executing new business opportunities. Following a product design and development roadmap, students participate in innovation games and charrette exercises, identify customer needs, and generate product concepts. Weekly assignments focus on the business aspects and general design concepts of new product development. The course culminates in the creation of a prototyped concept and submission of a business plan. Prerequisite: MBA-6XX Marketing Concepts and MBA-6XX Business Model Development.
IMBA 720	Data Models & Management	This course introduces students to operational databases and analytical databases in business environments. Topics include entity-relationship modeling, unified modeling language, relational database, SQL, data warehouse modeling, data mart modeling, and DBMS functioning. Emphases are on the understanding of data requirements for solving business problems, conceptual design of data models, logical design of databases, key elements of database management, and the differences between operational databases and analytical databases. Graphical tools for database conceptual design and modern DBMS systems are used to support the learning process of the topics.
IMBA 721	Business Analytics Modeling	This course focuses on up-to-date frameworks for successful business analytics modeling, and will cover processes, methods, techniques, evaluation, and tools. It includes overviews of text and web mining, sentiment analysis, as well as Big Data. Business analytics modeling best practices to enable timely, actionable, evidence-based decision making will be explored. Students will acquire an understanding of concepts with tutorials, case studies (both successful and failures), as well as hands-on applications.
IMBA 722	Business Analytics Practicum	The practicum provides students with an opportunity to gain real world experience by working with industry partners. Each project is sponsored by a company, allowing students to work with partner companies to gain analytics experience and reconcile theory with business practice. Student groups are supervised by a faculty member and work with the practicum company to identify, define, scope and analyze a particular business problem. Following an initial identification of project scope and purpose, students typically engage in data acquisition, data cleansing and restructuring, exploratory data analysis, feature extraction, model development and evaluation, modeling fitting and testing, remodeling and retesting, final modeling and data fitting, as well as oral and written communication of results. The ultimate learning objective is to solve a real-life business problem, improving bottom-line, and achieving business goals.

IMBA 730	Innovative Leadership	This course addresses the skills, concepts, and mind-set that support leadership in complex, innovative organizations. In the context of new business models and planning for uncertainty, topics include self-leadership, critiquing diverse models of leadership, creating vision and strategy, understanding people, managing change, ethical decision making, power and influence, motivation, facilitation of diverse teams, conflict resolution, and organizational culture.
IMBA 741	Financial Accounting & Reporting I	An in-depth study of current accounting issues and pronouncements, including long-term debt and troubled debt restructuring, accounting for leases, pension and post-retirement, income tax accounting, price-level adjusted financial statement reporting, and accounting for partnerships (equity, admission, profit and loss sharing, and liquidation).
IMBX 742	Financial Accounting & Reporting II	A continuation of Financial Accounting & Reporting I, including the study of accounting for business combinations (purchases and pooling of interests), accounting for the translation or remeasurement of foreign subsidiary financial statements into dollars to meet business combination reporting requirements, accounting for transactions denominated in a foreign currency (including purchases, sales, and hedges), and analysis of financial statements.
IMBA 743	Auditing & Attestation	A study of the development of financial compliance and operational auditing techniques, including analysis of current issues in the auditing profession such as audit risk, ethical conduct, materiality, audit sampling procedures, and reporting issues. These areas will be studied with reference to pronouncements of the accounting profession and current literature. The study of operational, as well as financial compliance auditing, will be enhanced using case studies and examples.
IMBA 759	Entrepreneurship	This course will provide an overview of the major elements of entrepreneurial activity including planning and evaluation of the business, financing, typical operating and administrative issues and alternatives for growth and sale. Entrepreneurial opportunities and challenges will be examined and a variety of venture opportunities will be analyzed. The course will give students a realistic look at the challenges involved in starting a viable business and help students in a personal evaluation of their own skills, talents and career potential. Utilizing business planning software, each student will prepare a comprehensive business plan for a business opportunity the student selects and perceives to be viable and practical. The plan may be utilized for presentation to potential investors.
IMBA 761	Promotion Management	This course focuses on the promotion and communication decisions of corporations and how to employ promotion strategy to solve marketing problems and enhance opportunities. Advertising, sales promotions, publicity, public relations and personal selling are investigated.
IMBA 762	Qualitative and Quantitative Marketing Research	This course gives students the qualitative and quantitative tools they need to find business opportunities and/or solve business problems. Students learn how to formulate the research problem, design the research, collect the data, and analyze the data. Various qualitative and quantitative research techniques will be examined and applied to identify opportunities, analyze data, and make strategic decision. Students will be required to conduct a research study using both qualitative and quantitative methods during the semester.
IMBA 772	Investment & Portfolio Management	Investment and Portfolio Management This course will acquaint the student with the tools essential for sound money management. Investment management begins by considering the goals of an investor with respect to risk exposure, the tax environment, liquidity needs and appreciation versus income potentials. Strategies will be developed to satisfy these objectives. Special attention will be paid to the theories of determinants of asset prices, including the capital-asset pricing model.

IMBA 776	Speculative Markets	Speculative Markets This course is intended to introduce students to financial futures, options and swaps. The objective of this course is to clearly explain why these securities exist and how to accurately price them. The course will present a balance of the institutional details, theoretical foundations and practical applications of this field.
IMBA 777	Fixed Income Securities	Fixed Income Securities This is a highly specialized course that focuses on the fixed income market with emphasis on the bond market. Topics include pricing of bonds, bond price volatility, types of fixed income securities, term structure of interest rates and bond portfolio-management strategies. Various fixed income products are analyzed in the course, including some derivative products in the context of fixed-income securities.
IMBA 792	International Business Innovatn	International Business Innovatn: The focus of this course is visiting representatives of U.S. and non-U.S. businesses in various industries abroad. The international business trip will span approximately two weeks. Students will meet with business executives, government officials, labor leaders and academicians in specific industries abroad. Students will gain an appreciation for both the formal business aspects and informal social aspects of conducting commerce in foreign countries. Registration requires permission of the Graduate Business Programs Office.
IMBA 797	Selected Topics	Selected Topics Content will vary in response to current issues.
INNOVATOR MBA (ON-LINE)		
IMBX 600	Management Concepts	This course introduces students to the theory and practice of managerial functions and decision-making models in traditional and more innovative organizations. Students are familiarized with the importance of organizational communications, including verbal and written communications and the criticality of using multiple communication channels. Students explore basic negotiation techniques and methods of conflict resolution.
IMBX 601	Marketing Concepts	This course provides students with a broad understanding of the various organizational marketing functions including the development, positioning, pricing, distribution, and promotion of products, services, and business ideas. Attention is focused on understanding of the basic marketing concepts including strategic planning, marketing mix, market segmentation, branding, consumer research, and marketing research and applying the knowledge to formulate marketing strategies for business opportunities.
IMBX 602	Managing Innovative People & Teams	Managing Innovative People and Teams This course addresses the skills and attitudes that support leadership in complex, innovative organizations under conditions of uncertainty and change. Students will explore the concept of self-leadership, managing change, ethical decision-making, power and influence, motivation, facilitation of diverse teams, conflict resolution, and organizational culture. The course begins with creative exercises in leadership style self-assessment and relates these results to leadership in new, innovative organizational structures.
IMBX 604	Business Model Innovation	In this course students fully explore how an organization creates, delivers, and captures value through a customer-centric approach to business model innovation. The impact of industry disruption through business model innovation will be explored as students analyze and evaluate existing models. Using creative thinking and specific patterns, students will gain experience in planning and executing new models to address the complex challenges facing businesses from a variety of industries in the market place today.

IMBX 625	Communication, Negotiation, Creative Economy	This course covers the concepts and art of effective management communications and negotiations in the business environment. The total communications process ? verbal, nonverbal, presentation, written and electronic ? is reviewed in the context of today?s work environment. The perspectives and needs of top management, interactive teams, individual contributors, and clients are examined and translated into professional practices. Experiential exercises and class discussions will build participants? understanding of styles and skills in negotiating. Coursework will focus on the uses of power, influence, and negotiating styles, methods of conflict resolution and means of influencing others.
IMBX 627	Competitive Tech Intelligence	This course will focus on the latest technological advances for managing data and communications effectively. Students will acquire the skills and concepts necessary to use a system to handle data efficiently for large and small organizations, national or international in scope. Network technology and usage of computer networks, as well as ethical and security issues will also be addressed. The concepts of telecommunications and the costs and benefits associated with this transmission of information will be explored. Methods of instruction include hands-on/application orientation.
IMBX 628	Accounting for Management Decisions	This course provides students previously exposed to financial and managerial accounting principles an opportunity to study the structure and use of accounting systems designed to aid management in controlling costs and profits. The course stresses the following: financial statement interpretation as a basis for decision making, cash flow analysis, cash budgeting, cost volume profit analysis, costing and interpretation of manufacturing systems and the impact of international competition, responsibility accounting and the impact of inflation.
IMBX 629	Financial Policy and Planning	This course focuses on the investment and financing decisions of firms. Topics include capital budgeting, cash management and cash flow analysis, capital structure, dividends and international operations. Financial policy making is considered within the context of contemporary valuation and risk management theories. Various financial planning models are analyzed in the course.
IMBX 630	Operations Systems Perspective	This course will focus on the mathematical models and methods available for use in formulating and analyzing business decision-making problems in industry. Areas of study include: probability theory, decision analysis, game theory, forecasting techniques, project management, queuing models, allocating scarce resources using linear programming and integer-programming techniques, and deterministic and probabilistic inventory models.
IMBX 642	Stratistical Insight & Implementation	This course explores the strategic visioning, planning and implementation process, with a focus on global industries and the challenges faced by businesses in an increasingly dynamic environment. Students analyze strategic threats and opportunities that confront businesses across the globe in the 21st century.
IMBX 700	International Economic and Finance	This course explores interrelationships between economic growth/development theories and financial applications in global markets, emphasizing international financial management techniques and practices. Topics include international trade, balance of payments, foreign exchange markets and risk, the international financial system, and portfolio effects of capital budgets on international capital markets. Students explore current issues of concern to multinational firms such as environmental problems, organizing for optimal results, sources and uses of funds, and accounting, tax, and control issues.

IMBX 714	New Product Development	This project-based, team oriented course provides a methodology for discovering and executing new business opportunities. Following a product design and development roadmap, students participate in innovation games and charrette exercises, identify customer needs, and generate product concepts. Weekly assignments focus on the business aspects and general design concepts of new product development. The course culminates in the creation of a prototyped concept and submission of a business plan. Prerequisite: MBA-6XX Marketing Concepts and MBA-6XX Business Model Development.
IMBX 720	Data Models & Management	This course introduces students to operational databases and analytical databases in business environments. Topics include entity-relationship modeling, unified modeling language, relational database, SQL, data warehouse modeling, data mart modeling, and DBMS functioning. Emphases are on the understanding of data requirements for solving business problems, conceptual design of data models, logical design of databases, key elements of database management, and the differences between operational databases and analytical databases. Graphical tools for database conceptual design and modern DBMS systems are used to support the learning process of the topics.
IMBX 721	Business Analytics Modeling	This course focuses on up-to-date frameworks for successful business analytics modeling, and will cover processes, methods, techniques, evaluation, and tools. It includes overviews of text and web mining, sentiment analysis, as well as Big Data. Business analytics modeling best practices to enable timely, actionable, evidence-based decision making will be explored. Students will acquire an understanding of concepts with tutorials, case studies (both successful and failures), as well as hands-on applications.
IMBX 722	Business Analytics Practicum	The practicum provides students with an opportunity to gain real world experience by working with industry partners. Each project is sponsored by a company, allowing students to work with partner companies to gain analytics experience and reconcile theory with business practice. Student groups are supervised by a faculty member and work with the practicum company to identify, define, scope and analyze a particular business problem. Following an initial identification of project scope and purpose, students typically engage in data acquisition, data cleansing and restructuring, exploratory data analysis, feature extraction, model development and evaluation, modeling fitting and testing, remodeling and retesting, final modeling and data fitting, as well as oral and written communication of results. The ultimate learning objective is to solve a real-life business problem, improving bottom-line, and achieving business goals.
IMBX 730	Innovative Leadership	This course addresses the skills, concepts, and mind-set that support leadership in complex, innovative organizations. In the context of new business models and planning for uncertainty, topics include self-leadership, critiquing diverse models of leadership, creating vision and strategy, understanding people, managing change, ethical decision making, power and influence, motivation, facilitation of diverse teams, conflict resolution, and organizational culture.
IMBX 731	Design Thinking in Business	This course focuses on the intersection between design thinking and opportunity-finding for strategy development, covering theory and practice related to innovation, complexity, emergence, and systems thinking to develop strategies that drive organizational change and new value propositions. It begins with review of frameworks for strategy development and explores approaches to engage stakeholders in that development. Students use lifecycle analysis to redesign an existing organizational strategy and develop an actionable communication rollout plan.

IMBX 732	Design Research & Project	This course covers all aspects of the entrepreneurial process, providing students with principles of design research for creating successful new ventures. This course addresses the entrepreneurial mindset, creativity and idea generation, assessing entrepreneurial opportunities, conducting feasibility studies and market research, developing marketing plans, financial preparation for new ventures, location and capacity planning, new venture team building, legal issues and risk analysis. The course focuses on the development of an effective business plan for a new venture.
IMBX 741	Financial Accounting & Reporting I	An in-depth study of current accounting issues and pronouncements, including long-term debt and troubled debt restructuring, accounting for leases, pension and post-retirement, income tax accounting, price-level adjusted financial statement reporting, and accounting for partnerships (equity, admission, profit and loss sharing, and liquidation).
IMBX 742	Financial Accounting & Reporting II	A continuation of Financial Accounting & Reporting I, including the study of accounting for business combinations (purchases and pooling of interests), accounting for the translation or remeasurement of foreign subsidiary financial statements into dollars to meet business combination reporting requirements, accounting for transactions denominated in a foreign currency (including purchases, sales, and hedges), and analysis of financial statements.
IMBX 743	Audit and Attestation	A study of the development of financial compliance and operational auditing techniques, including analysis of current issues in the auditing profession such as audit risk, ethical conduct, materiality, audit sampling procedures, and reporting issues. These areas will be studied with reference to pronouncements of the accounting profession and current literature. The study of operational, as well as financial compliance auditing, will be enhanced using case studies and examples.
IMBX 759	Entrepreneurship	This course will provide an overview of the major elements of entrepreneurial activity including planning and evaluation of the business, financing, typical operating and administrative issues and alternatives for growth and sale. Entrepreneurial opportunities and challenges will be examined and a variety of venture opportunities will be analyzed. The course will give students a realistic look at the challenges involved in starting a viable business and help students in a personal evaluation of their own skills, talents and career potential. Utilizing business planning software, each student will prepare a comprehensive business plan for a business opportunity the student selects and perceives to be viable and practical. The plan may be utilized for presentation to potential investors.
IMBX 761	Promotion Management	This course focuses on the promotion and communication decisions of corporations and how to employ promotion strategy to solve marketing problems and enhance opportunities. Advertising, sales promotions, publicity, public relations and personal selling are investigated.
IMBX 762	Quality & Quantity Marketing Research	This course gives students the qualitative and quantitative tools they need to find business opportunities and/or solve business problems. Students learn how to formulate the research problem, design the research, collect the data, and analyze the data. Various qualitative and quantitative research techniques will be examined and applied to identify opportunities, analyze data, and make strategic decision. Students will be required to conduct a research study using both qualitative and quantitative methods during the semester.

IMBX 772	Investment & Portfolio Management	Investment and Portfolio Management This course will acquaint the student with the tools essential for sound money management. Investment management begins by considering the goals of an investor with respect to risk exposure, the tax environment, liquidity needs and appreciation versus income potentials. Strategies will be developed to satisfy these objectives. Special attention will be paid to the theories of determinants of asset prices, including the capital-asset pricing model.
IMBX 776	Speculative Markets	This course is intended to introduce students to financial futures, options and swaps. The objective of this course is to clearly explain why these securities exist and how to accurately price them. The course will present a balance of the institutional details, theoretical foundations and practical applications of this field.
IMBX 777	Fixed Income Securities	Fixed Income Securities This is a highly specialized course that focuses on the fixed income market with emphasis on the bond market. Topics include pricing of bonds, bond price volatility, types of fixed income securities, term structure of interest rates and bond portfolio-management strategies. Various fixed income products are analyzed in the course, including some derivative products in the context of fixed-income securities.
IMBX 792	International Business Innovation	The focus of this course is visiting representatives of U.S. and non-U.S. businesses in various industries abroad. The international business trip will span approximately two weeks. Students will meet with business executives, government officials, labor leaders and academicians in specific industries abroad. Students will gain an appreciation for both the formal business aspects and informal social aspects of conducting commerce in foreign countries. Registration requires permission of the Graduate Business Programs Office.
IMBX 797	Selected Topics	Selected Topics Content will vary in response to current issues.
INTEGRATIVE NUTRITION		
IN 500	Foundations in Integrative Nutrition	This course provides the necessary framework for developing a patient-centric approach for personalizing nutritional recommendations that are based on latest data. This course will explore the current evidence for topics in nutrition, including the role of various nutrients for proper biological function and regulation, common health consequences resulting from imbalances in macronutrients (protein, fat, carbohydrates) and micronutrients (fat versus water soluble vitamins), the effects that different dietary and environmental exposures can have on altering the gut microbiome, and the implications of these factors on overall health. This course will also introduce the concept of interconnectedness of different body systems and the role of assessing symptomatic and functional markers of nutrient/nutritional imbalance. Competency with this foundational material will be demonstrated by, in part, analyzing realistic case study examples that formulate nutritional care plans and/or nutritional recommendations that are designed to optimize health.

IN 510	Functional Genomics, Proteomics, and Metabolomics	<p>Recent advancements in technology have resulted in the availability of large amounts of bioinformatic data (e.g. genomics, proteomics, and metabolomics). These techniques are becoming widely applied to identify biological variants (e.g. genetic biomarkers) to better characterize complex biochemical systems and understand pathophysiological processes. This online, modular, lecture-based course will describe how functional biomarkers might be used to refine diagnoses of nutritional insufficiency and excess by reviewing, interpreting, and discussing the nutritional implications of basic and specialty laboratory findings. Additionally, the content of this course will describe how bioinformatic data can be integrated into designing nutritional care plans that combine conventional clinical care with nutritional prescriptions towards improving outcomes in patients with specific diagnoses. This course will also address some of the legal and ethical considerations related to decision making and patient care using this type of information such as understanding what information might be disclosed, to whom, for what reasons; discussing any relevant financial implications or considerations with patients; and how to assess risk and mitigate malpractice events.</p> <p style="text-align: right;">Prerequisite: IN 500</p>
IN 520	Advanced Concepts in Integrative Nutrition	<p>The content for this lectured-based, modular course builds on the content learned in the Foundation of Integrative Nutrition but exploring more advanced concepts related to nutritional biochemistry, metabolism, homeostasis, and biological crosstalk between organ systems. Specific emphasis will be focused on dietary influences at a molecular and biochemical level exploring the interrelationship of nutrients, metabolic pathways, health, and common diseases (e.g. cardiovascular, diabetes, obesity, cognitive dysfunction/decline). Content in this course will explore how the health of some organs can serve as potential indicators that can be used to predict or prevent underlying or health concerns, and how nutritional modulation can influence the development and progression of several common diseases as the human body ages. It will examine the potential adverse effects of nutrient deficiencies, as well address how inflammatory and cardiovascular issues can affect the brain, vascular biology and vascular aging, dislipidemia, hypertension, and cancer. Students will learn about integrative approaches to prevent and treat common chronic disease as well demonstrate competency in recommending personalized, evidence-based nutritional and lifestyle medicine approaches to their patients. Various case reports will be included in the course content and to further reinforce practical application of the course content, students will be required attend and participate in the department's clinical grand rounds sessions.</p> <p>Prerequisite: IN 500 & IN 510</p>
INTERACTIVE DIGITAL DESIGN		
IDD 510	Essentials of Interactive Design	<p>This course will give students a foundation in the three core disciplines of interactive design: quality design skills, software competency and programming knowledge. Additionally, proper research and presentation practices will be reinforced to provide students with a structured methodology vital to their program and career success. The outcome is a well-produced and portfolio quality website with supporting documentation that demonstrates comprehension of industry-standard knowledge.</p>
IDD 600	Virtual Reality Design	<p>This studio course focuses on exploring virtual reality including an understanding of virtual environments, how users interact within a virtual space, and how VR can be explored to create new & innovative user experiences. Two major components of the class are contemporary practical examples and tutorials with new and emerging technologies. Student projects will provide a space for a hands on learning experience. Graduate students are expected to research and conceptualize implementations of VR for future impact on digital media.</p>
IDD 601	Cognitive Psychology for Design	<p>This course introduces students to core cognitive psychological concepts that drive strong interface design, and the subsequent user research practices that uncover the operation of these concepts. Students will analyze examples of designs (either in their portfolio or in the marketplace) to see these concepts at work, and present these examples each week in a casual setting. Students will also be exposed to different methods of inquiry and analysis, so that they understand how each method draws out explicit and implicit assumptions (i.e., the methodology).</p>

IDD 621N	Digital Experience Design	Digital Experience Design develop the student's ability to synthesize 2D, 3D and 4D conceptions of space with knowledge and skills of interactivity to create and produce the digital experience. This studio will solidify and expand the student's vocabulary and ability to innovate within the digital context. Students will complete a project that explores spatial, emotional, informational and communicative issues. The project should reflect a high degree of conceptual, aesthetic and technical mastery for successful completion of this course.
IDD 625	Advanced Web Design & Strategy	Web Design This course will focus on the design of the online experience. Emphasis will be given to an understanding and mastery of the design issues involved in creating user interfaces and content for low bandwidth dissemination. A semester-long project will develop the student's abilities in both the design and production of web-based media. The project will include components such as site architecture/planning, digital imaging and typography for the web, interface design, and XHTML, and CSS production.
IDD 628	3-D Modeling	3D Modeling This elective course exposes students to the conceptual and technical aspects of three-dimensional modeling, photo-realistic rendering and virtual environments. Students will complete a series of specifically designed exercises of increasing difficulty, leading to a final project of the student's choosing. The class will cover the basic principles of 3D modeling and animation including polygonal and NURBS modeling, texturing, lighting, and animation.
IDD 631N	Digital Innovation Design	Digital Innovation Design This second in a sequence of three studios focuses on the ability of individual designers to pursue innovation. This course is comprised of several projects which highlight the role that digital designers play in the multi-disciplinary attempt to bridge the gap between functionality and usability. Students will address current interface design issues through a series of screen-based projects, each ranging in complexity and theme, and placing particular emphasis on the visual and semantic aspects of design solutions. Students will be expected to seek new ways to navigate through 4D environments, challenging common interface paradigms. They are encouraged to build 4D spaces that are expressive, dynamic and experiential, while retaining their intuitive usefulness.
IDD 632	Database Management & Scripting	Database Management and Scripting Using PHP, students will learn fundamental server-side scripting concepts like creating arrays and functions, automating Unix commands, gathering and processing user input, and dynamically writing out HTML and JavaScript. Relational Database concepts are covered and students will learn to conceptually model data and to create, query, and manage their database using SQL. The course will culminate with the students, for their final project, creating a web application that ties HTML front-end to a MySQL database using PHP.
IDD 635	Interactive Narrative/Drama	Since the beginning of time, storytelling has been used as a universal practice that has proven to be a powerful tool of communication for fostering understanding, social inquiry, and self-expression. Interactive narrative is an emerging interdisciplinary genre which uses interactivity, hypertext, video and film, sound, drama, videogames, literary fiction, multi-user spaces, interactive installations, live performance, and artificial intelligence to tell a story. This course will explore theoretical perspectives on both interactivity and narrative structure and provide an overview of the forms, strategies, and conventions of each while emphasizing approaches on how to integrate the two.
IDD 637	Mobile Communication Design	As a society, our ability to communicate from anywhere on the globe has become increasingly more important. Designers today are faced with new challenges, paradigms, and habits that have been adopted due to mobile communications. Designing strictly for the desktop only is a thing of the past. In this class, students will explore a strategic process of how to design for today's multiscreen environment with a focus on mobile platforms. We will be designing interactions that happen literally within the palm of our hands and crafting unique, cutting edge user experiences for users of mobile devices. Design and development will be taught as an overall curriculum. At the end of the course, students will have an understanding of how to plan, design, develop, and market potential mobile applications.

IDD 700	Information Architecture	This course focused on a UX designer's role in system development, specifically information architecture (IA). Students will develop, document, and present user-centered IA recommendations to create more usable products & services.
IDD 797	Special Topics:	An upper-level course designed to take advantage of resident/adjunct/visiting faculty members' expertise or a special focus wanted by the School for one or two terms. These courses might provide an in-depth treatment of recent advances in subjects of current interest in a given field whose subject matter is not necessarily needed to be offered long term. A specific "topic" may be delivered a maximum of two term. Prerequisites: Announced prior to registration
IDD 798	Independent Study	This course will allow students to pursue individual areas of interest while working jointly with a faculty member. Enrollment is subject to the availability and approval of both the program director and faculty member. The student must have 18 or more graduate-level credits, and a prospectus of the proposed independent study must be approved at least one month prior to registration. See appropriate form online at registrar's webpage.
IDD 941	Digital Design Synthesis Project Preparation	This course is the first step towards completing the final synthesis project. Students will be asked to identify and analyze potential projects through a number of lenses including technical feasibility, marketability and design potential. With faculty guidance, each student will select a particular project based upon individual interests and professional aspirations. In order to successfully complete this course, a final document must be submitted by the student outlining the relevant factors that will determine the route to developing a successful synthesis project.
IDD 941N	UXD Thesis Project Preparation	Digital Design Synthesis Project Preparation This course is the first step towards completing the final synthesis project. Students will be asked to identify and analyze potential projects through a number of lenses including technical feasibility, marketability and design potential. With faculty guidance, each student will select a particular project based upon individual interests and professional aspirations. In order to successfully complete this course, a final document must be submitted by the student outlining the relevant factors that will determine the route to developing a successful synthesis project.
IDD 942	UXD Thesis Project	This is the third of a sequence of three studios focusing on interdisciplinary digital design. This synthesis studio will develop the ability of the digital designer to successfully bring a digital design project to completion. Students will develop a final, working prototype of a product, service, entertainment or publication of their choice that synthesizes all of their knowledge and skill from the previous semesters. The final project must demonstrate marketability and/or successful functionality within the larger community.
INTERIOR ARCHITECTURE		
IARC 601	Design III for Interior Architecture	Building on skills and knowledge introduced in Design I and Design II, this studio focuses on the process of designing medium scale design projects. Students engage in the conceptual, functional, and aesthetic issues, integrating research and evidenced-based decision making with the intuitive nature of the design process. Emphasis is placed on the fundamental processes related to the development of a complete interior, from research and space planning, to the selection and arrangement of appropriate furnishings and finishes. Students will also explore the influence of behavioral and cultural factors on the functional and aesthetic quality of the built environment, and will communicate their designs by applying a range of presentation techniques. Prerequisite: IARP 502

IARC 602	Design IV for Interior Architecture	<p>This studio emphasizes the resolution of complex interior design issues in the context of community/wellness and healthcare interiors. With a focus on well-being in the built environment, students develop a holistic conceptual approach to their design. In determining a design strategy, students research, develop and analyze the problem in the context of the relevant environmental, cultural, socio-economic and behavioral factors, and then proceed with a completed design. Large- and small-scale space planning, materials, lighting design, furnishings and codes and regulations are emphasized in the completed work.</p> <p>Prerequisite: IARC 601</p>
IARC 603	History of Design II for Interior Architecture	<p>This writing focused course offers a global view of major historical movements and theoretical constructs that define interior design in the context of architecture, decorative arts, and art from prehistoric to contemporary times. Discussion focuses upon socio-economic, cultural, ecological, and physical contexts that inform the greater context for interiors, architecture, art, furniture, decorative arts, and material culture. In depth discussions and readings will focus on critical analysis and developing awareness of historical precedents.</p> <p>Prerequisite: IARP 505</p>
IARC 604	Visual Communication II	<p>This Revit-based advanced digital imaging course focuses on the advantages of building information modeling software (BIM) and related documentation techniques for integrated practice and collaboration. Students will build their knowledge of professional interior construction and specification documentation, produce a set of construction drawings for an interiors project, and explore other uses for this powerful and important type of program.</p> <p>Cross-level course: INTD 206 Prerequisite: IARP 504</p>
IARC 607	Technology I for Interior Architecture	<p>This course focuses on materials, construction, installation as it specifically relates to interior design and basic structural systems. Students will be introduced to the nature and characteristics of interior detailing in relation to interior construction such as architectural woodwork, millwork, partitions, floors, ceilings, stairs, custom cabinetry, furniture, and specialty elements. The influence of interior finish materials on interior form and detailing will be explored. Additional foci include environmental factors, human factors, codes, regulations, standards and construction documentation.</p> <p>Cross-level course: INTD 206 Prerequisite: IARC 601</p>
IARC 608	Technology II for Interior Architecture	<p>This second course in the Interior Architecture technology sequence introduces students to the art and science of interior illumination, energy usage, and various control systems including power, security, communications, and life-safety. Both artificial illumination and day lighting are covered with an emphasis on the architectural aspects of lighting design. Through lectures, demonstrations, and assignments, student explore various lighting design strategies, the effects of light on color, and how effective lighting can contribute to the goal of creating a sustainable interior.</p> <p>Prerequisite: IAR -601</p>
IARC 610	Textiles and Materials	<p>This course introduces the role of textiles and other applied materials in the creation of commercial and residential interiors. Key topics include the selection, specification and application of textiles and materials based on their properties and performance criteria; sources of textiles and materials, the concept of sustainable resources; appropriate installation methods and maintenance requirements of textiles and materials in interior applications; and codes, regulations and standards related to use of textiles and materials in interiors.</p> <p>Cross-level course: INTD 310</p>

IARC 612	Advanced Visualization: Interiors	This course teaches advanced digital three-dimensional modeling, rendering, and evolving digital technologies with a focus on interior environments. Emphasis is placed on compelling representation of interior spaces, forms, materials, furniture, color, and lighting effects. These professional level skills enhance design representations and presentations. Students complete a series of exercises and projects covering a series of advanced digital techniques. Cross-level course: INTD 306 Prerequisite: IARC 604
IARC 614	Furniture Design	This elective course is intended to provide students with a basic knowledge of the aspects involved in furniture design. The goal is to expose students to the various means through which one engages in product design. Emphasis is on the fabrication process in addition to proto- typing, testing and revision. The course consists of readings, brief lectures, class discussions and studio projects that cover the range of information that designers need to know to be able to specify, design and evaluate furniture-related products for the built environment. A significant amount of class time will be devoted to the development, design and revision of projects Cross-level course: INTD 325
IARC 616	Environments for Well-Being	This course provides an introduction to a range of viewpoints, concepts, and characteristics of human behavior in the physical environment. Cultural, social, and psychological factors are examined, e.g., relationships to the built and natural environment, responses to open and enclosed spaces (both interior and exterior), and role of patterns, textures, aromas, daylight, water, etc. Various theories and methods of environmental assessment and design are studied that are based on an understanding of mutually supportive relationships between people and their physical environment. This course looks at how people use and are impacted by various environments and stimuli from a range of cultural, psychological and physical perspectives. Cross-level course: ISEM 360
IARC 701	Design - Study Away	This studio is part of the study away experience and focuses on how culture, context, history, precedent, construction technology, and human factors influence design, while exploring innovative materials and craft in the field of interior architecture. Assigned projects address how design needs may vary for different populations and how understanding social and cultural norms are relevant to making appropriate design decisions. Students consider the role of construction techniques, material selection, and ergonomics in the design process and detailing as they will apply this information to their design work.
IARC 702	Design V for Interior Architecture	This advanced studio emphasizes the resolution of complex interior design issues in the context of collaboration and a multi-disciplinary approach. In determining a design strategy, students research, develop and analyze the problem, relevant environment and behavioral factors, and then proceed with a completed design. Holistic development of concept, current sustainable design solutions, space planning, materials, furnishings, lighting design, building systems, codes, regulations and standards are emphasized in the completed work. Prerequisite: IARC 602
IARC 703	Theory for Design- Study Away	This advanced history and theory seminar immerses students in both historical and contemporary examples of architecture, interiors and decorative arts. Through a combination of readings, writings, discussion and field work, students explore the relationship between culture, and building form, furnishings, and the distinctive use of materials and ornament.
IARC 707	Technology III for Interior Architecture	This final course in the technology sequence focuses on the study of a broad range of mechanical, plumbing, HVAC, and other building systems and their integration with interior construction. Students are be introduced to the issues of acoustical control, indoor air quality, and life safety in building interiors and the critical role that interior building systems and materials play in the establishment of human comfort and the protection of the health, safety and welfare of building occupants. Prerequisite: IARC 608

IARC 708	Professional Practice & Ethics	<p>In this course, students are introduced to the administrative, financial, legal and ethical aspects of professional practice, including types of business formations, marketing, contracts, industry relationships and project management. Lectures and assignments cover a range of specialized services performed by design firms, and the role and responsibilities of the designer in different positions and at various stages of their career. Life-long learning, professional development and the value of professional organizations will be discussed. Guest speakers will add a unique insight into the profession.</p> <p>Cross-level course: INTD 412 Prerequisite: IARC 602</p>
IARC 709	Research and Programming	<p>This Master's Project Research & Programming course is the first course in a two-semester course sequence and year-long research and design investigation. In this course students will explore a contextualized topic within a field of inquiry relating to the interior built environment. Through an individualized area of investigation students will develop a thesis. This thesis will guide their focused research, investigation and programming to be used for design and development in their Master's Project the following semester. Students will produce a Master's Project Research & Programming Document, which will be the result of the research, analysis, and synthesis of information. It will articulate a clear definition of project parameters and programming. The process of generating this document will recapitulate and augment the research and programming methodologies, which students have been exposed to in previous interior design courses.</p> <p>Prerequisite: IARC 602</p>
IARC 710	Master's Project for Interior Architecture	<p>The Interior Architecture Master's Project studio is the second part of a two-semester course sequence and year-long research and design investigation. This semester provides students with an opportunity to expand on their research and prove their thesis through application to a design project. The student must demonstrate aptitude and understanding of architectural and interior design theory, principles, technology, as well as overall design competence. The Master's Project semester allows students to further their investigation and proposed thesis through a design exploration and project development. Students will develop a comprehensive presentation that integrates their design research, conceptual response, schematic design, design development, and design detailing in a final design solution.</p> <p>Prerequisite: IARC 604, 702, 707, & 709</p>
IARC 797	Special Topics for Interior Architecture	<p>This course provides an opportunity to explore topics in interior architecture not developed in other courses. Examples include advanced visualization techniques, human behavior studies, specialized history/theory topics, furniture design, ergonomics, environmental psychology, and more. Students may take this course more than once as the topics differ each time it is offered.</p> <p>Prerequisite: IARC 601 (with approval by director)</p>
IARC 798	Independent Study	<p>This course will allow students to pursue individual areas of interest while working closely with a faculty member. For further details, see the general description of Independent Study in the "University Academic Policies and Procedures" section of the academic catalog. See appropriate form online at the University Registrar's web page for more information. Prerequisite: Completed second year of program. Enrollment dependent on availability of faculty mentor and permission of program director.</p>
INTERIOR ARCHITECTURE PREP		
IARP 501	Design I for Interior Architecture	<p>This studio course is an introduction to design for graduate interior architecture majors that have not had previous design experience on any level. It will serve as an introduction to fundamental design principles and vocabulary, process methodologies, problem-solving strategies, and craft. Lectures and demonstrations stress abstraction as a primary building block in addition to an emphasis on historical case-study methodologies to investigate successful design strategies.</p>

IARP 502	Design II for Interior Architecture	<p>The focus of this studio is an introduction to the elements, principles and theories of interior design. Through a series of projects of increasing size, students explore the conceptual, theoretical, functional, and aesthetic issues of designing interior space. Included are the elements of enclosure, the interrelationship of spaces, and environmental and behavior factors, as well as symbolism and socio-cultural factors. The experiential and intuitive nature of the design process is investigated, as is the contributing role of finishes and furnishings in the definition of interior architectural space.</p> <p>Prerequisite: IARP 501</p>
IARP 503	Graphic Representation	<p>This course covers the fundamentals of freehand and mechanical architectural graphic representation, with a special focus on the interior environment, for both presentation and construction documentation purposes. Topics include sketching and the construction of orthographic and para-line projections, including floor plans, elevations, sections and one-point and two-point perspective drawings. In addition, students learn how to graphically depict furniture, to enhance their drawings through the use of shade and shadow, and basic rendering techniques. Projects include surveying of actual sites and translating field notes into a set of coordinated drawings.</p>
IARP 504	Visual Communication I	<p>The primary intent of this course is to introduce students to fundamental CAD skills using AutoCAD and other applications to establish the computer as an effective tool for architectural graphic communication and as a means for exploring, refining, and presenting design ideas. Through a series of assignments and projects, students will acquire the knowledge and skills to digitally communicate design concepts at various stages of development, and for multiple purposes.</p> <p>Prerequisite: IARP 501</p>
IARP 505	History of Design I for Interior Architecture	<p>This Lecture course surveys key examples of Western and non-Western architecture produced from prehistory through the 21st century. By tracing significant historical themes, students compare and contrast the various historical styles and acquire a working vocabulary for both analyzing and evaluating the built environment, and relating developments in the built environment to other forms of artistic expression such as painting and sculpture. Works are placed within a broad historical context by considering factors such as religion, philosophy, political and economic developments, as well as materials, construction methods, and local factors.</p>
IARP 508	Presentation Techniques	<p>This course explores the broad array of presentation techniques available to advantageously convey a designed interior. Emphasizing the presentation of a complete interior, students will refine and expand their drawing and model-building skills using a wide range of media and integrating manual and digital techniques. This course also addresses the interrelationship of the visual and verbal components of making an effective presentation. (Graduate students are expected to have an increased workload and depth than the undergraduate (INTD-208) version)</p> <p>Cross-level course: INTD 208 Prerequisite: IARP 501 & 503</p>
INVASIVE CARDIOVASCULAR TECHNOLOGY		
RSI 502	Noninvasive Testing Principles and Procedures	<p>Provides a foundation in the basic principles of electrocardiography. Presents an overview of the theory and diagnostic techniques utilized by technologists in noninvasive laboratory. Emphasizes the development of a systematic approach to electrocardiographic interpretation, dysrhythmia analysis, exercise stress testing, Holter monitoring, nuclear medicine procedures, phonocardiography and pacemaker evaluation.</p>

RSI 511	Cardiovascular Physiology	Presents the construction and dynamics of the cardiovascular system in detail. Includes the development of the cardiovascular system, anatomical and physiological characteristics, heart sounds, biophysics of the cardiac cell, cardiac pumping action and its regulation, cardiovascular hemodynamics, coronary blood flow, systemic and pulmonary circulation and the control of regional circulation.
RSI 512	Cardiovascular Pathophysiology	Continuation of Radiologic Sciences I 511, Cardiovascular Physiology. Provides a physiologic and technical back-ground for the various diagnostic and therapeutic techniques in the field. Emphasizes the pathophysiological mechanisms of acquired and congenital cardiovascular diseases as well as their clinical presentation, detection and treatment. Prerequisite: RSI 511
RSI 513	Radiobiology & Health Physics	Content is designed to present an overview of the principles and practices of radiation protection including the responsibilities of the radiographer for patients, personnel, and the public. Radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies, and health care organizations are incorporated. Content is designed to provide an overview of the principles of the interaction of radiation with living systems. Radiation effects on molecules, cells, tissues and the body as a whole will be presented. Factors affecting biological response are presented, including acute and chronic effects of radiation
RSI 531	Clinical Invasive I	Requires observation and application of clinical principles in an invasive cardiovascular laboratory. Emphasizes the professional attributes and fundamental technical skills necessary to perform as a team member during invasive procedures. Students synthesize learning from the didactic, laboratory and instrumentation courses. Students must demonstrate competency in the performance of ICVT procedures.
RSI 532	Clinical Invasive II	Continuation of Radiologic Sciences I 531, Clinical Invasive I. Students continue application of ICVT skills. Students must demonstrate competency in the performance of ICVT procedures. Prerequisite: RSI 531
RSI 533	Clinical Invasive III	Continuation of Radiologic Sciences I 532, Clinical Invasive II with active participation in an invasive cardiovascular laboratory. Emphasizes the professional attributes and technical skills necessary to perform as a team member during interventional techniques, electrophysiology studies and specialty applications in congenital and acquired disease states. Presents the opportunity to work more independently in the performance of invasive cardiovascular procedures. Students accept more responsibility for simple procedures and begin to perform more complex procedures under supervision. Prerequisite: RSI 532
RSI 538	Invasive Procedures I	Provides guided practice in the performance of procedures utilized in diagnostic invasive cardiovascular procedures. Includes sterile technique, circulating and monitoring procedures, pharmacologic identification, room set-up and film processing.
RSI 539	Invasive Procedures II	Continuation of Radiologic Sciences I 538, Invasive Procedures I. Provides guided practice in the performance of advanced invasive cardiovascular procedures in a laboratory setting. Emphasizes the clinical application and operation of equipment utilized in interventional and electro-physiologic studies. Prerequisite: RSI 538
RSI 541	Radiography Physics and Instrumentation I	This course will provide the student with content that establishes a knowledge base in radiographic, fluoroscopic and mobile equipment requirements and design. The content also provides a basic knowledge of quality control. Content establishes a basic knowledge of atomic structure and terminology. Also presented are the nature and characteristics of radiation, x-ray production and the fundamentals of photon interactions with matter.

RSI 542	Radiographic Physics & Inst I	This course will provide the student with content that establishes a knowledge base in radiographic, fluoroscopic and mobile equipment requirements and design. The content also provides a basic knowledge of quality control. Content establishes a basic knowledge of atomic structure and terminology. Also presented are the nature and characteristics of radiation, x-ray production and the fundamentals of photon interactions with matter. Content imparts an understanding of the components, principles and operation of digital imaging systems found in diagnostic radiology. Factors that impact image acquisition, display, archiving and retrieval are discussed. Principles of digital system quality assurance and maintenance are presented. Prerequisite: RSR 541
RSI 557	Invasive Principles I	Provides a comprehensive introduction to the fundamental skills and principles needed to perform diagnostic cardiac procedures. Emphasizes indications and contraindications and the collection of diagnostic information obtained during the procedure. Students utilize these fundamentals to evaluate acquired cardiovascular disease states.
RSI 558	Invasive Principles II	Continuation of Radiologic Sciences I 557, Invasive Principles I. Emphasizes emergency and interventional techniques, electrophysiology studies and specialty applications in congenital and acquired disease states. Prerequisite: RSI 557
RSI 583	Invasive Review Seminar	Presents a comprehensive review of the physical principles, instrumentation and clinical applications of invasive cardiac procedures in preparation for the certification examination.
LABORATORY SCIENCE		
LS 501	Molecular Biology	Principles and mechanisms of cellular function at the molecular level, including an overview of experimental techniques; gene expression, structure and replication; mutations and repair of DNA; synthesis of RNA upon DNA template; synthesis of DNA upon RNA template; recombinant DNA; amplification and analysis; molecular basis of genetic disease and cancer, and diagnostic applications.
LS 504	Biochemistry	Examines structure and function of biological macromolecules, polysaccharides, proteins and nucleic acids; lipids; enzymes and metabolism; bioenergetics; control mechanisms; hormones; body fluids; nutrition; and biochemical pathology.
LS 510	Introduction to Molecular Diagnostics	Course focusing on the techniques, procedures and protocols used in the molecular preparation and interpretation of biologic fluids and other human specimens using genetic technologies, nucleic acid hybridization and amplification techniques, immunochemistry and biosensor technology. Laboratory sessions cover contemporary procedures for diagnostic testing such as prognostic markers, DNA analysis, FISH, PCR, blotting techniques and DNA sequencing. Lecture and Laboratory.
LS 511	Functional Histology	Microscopic study of the human body including normal histology and physiology and relationships to life processes through interactive lecture and microscopy laboratory sessions.
LS 523	Clinical Chemistry I	Study of the significance of chemical analytes indicative of human health and disease. Theory, operating principles and utilization of biochemical instrumentation and techniques for research in and testing of clinically significant analytes. Photometric and electrophoretic methodologies are used to test analytes including but not limited to carbohydrates, proteins, enzymes, lipids, drugs of abuse, therapeutic drugs and tumor markers. Quality control and preventive maintenance methods are emphasized. Lecture and laboratory.
LS 531	Immunology	Examines basic principles and mechanisms of the immune system in the physiologic condition and in the disease. Contains didactic and laboratory practical modules. Immune mechanisms in infections, hypersensitivity reactions, autoimmunity, immunodeficiencies, as well as tumor and transplantation immunology are discussed. The lectures are provided on the BBL as PowerPoint presentations with written notes under each slide.

LS 540	Current Research in the Biosciences	Examination and critical review of the literature pertaining to the bioscience disciplines of biotechnology, cytotechnology and medical technology. Students or faculty present research articles from contemporary literature or results of recent work for critical discussion. Undergraduate students submit a written abstract of each of two presented articles. Entry-level master's students, in addition, select a topic of interest, research the literature and produce a comprehensive review suitable for publication in a peerreviewed journal.
LS 603	Research Design	Methods and techniques for extending the scientific base of knowledge for bioscience laboratory practice. Students analyze contemporary research studies, designs and related statistical processes to assess their appropriateness for answering experimental hypotheses and laboratory practice issues. Education methods and communication skills relevant to disseminating scientific findings are emphasized.
LS 610	Regulatory and Fiscal Issues in Laboratory Management	Study and application of professional, regulatory and fiscal requirements for laboratory operations including federal, state and local requirements governing clinical and research laboratories; compliance issues; billing and reporting requirements for laboratories using private, managed care and other third party payers (including federal government programs); current procedural terminology to assign and bill for laboratory procedures; budgeting for laboratory operations.
LS 613	Pathology	Study of basic disease processes of the body including inflammation, repair, hemodynamic disorders, and neoplasia; and specific disease processes affecting the major body systems.
LS 620	Laboratory Information Systems	Design and use of information systems for clinical, anatomic and research laboratories. Vendor demonstrations, hands-on practice and trouble-shooting of data protocol development, input and retrieval to produce useful information for laboratory operations.
LS 630	Laboratory Services Research	Overview of the various techniques and resources used to influence and measure performance improvement, proper test utilization and best practices as strategies to improve the effectiveness of patient care. Students examine the relevant literature and develop instruments to assess the laboratory's role in cost-effectiveness, access to laboratory testing and quality of laboratory testing.
LS 640	Methods in Bioscience Education	An exploration of the modern pedagogy unique to science education and learning environments. Includes the design and delivery of content, an exploration of active learning environments, student engagement, online learning and the integration of writing and critical thinking in the classroom.
LS 644	Laboratory Education and Instruction	Completion of teaching and learning experience(s) in classroom, on-line and/or laboratory practice settings. Students acquire and demonstrate fundamental knowledge and practical skills in education administration, delivery and evaluation. Pre/Co-requisite: LS640 and completion of or concurrent discipline-specific coursework in the planned area of performance and permission of program director.
LS 645	Laboratory Administration and Management	On-site interaction with and immersion in administrative duties enabling students to observe, participate in and evaluate the various functions and responsibilities associated with laboratory organization and management. Under direct supervision of a laboratory director, supervisor, manager, or administrator, the student assesses management and administrative roles and outcomes within the laboratory as a means to develop and refine leadership skills Prerequisite or Corequisite: LS 610 or other approved graduate management course
LS 698	Special Topics in Laboratory Education	Completion of teaching and learning experience(s) in classroom, on-line and/or laboratory practice settings. Students acquire and demonstrate fundamental knowledge and practical skills in education administration, delivery and evaluation. Prerequisite: Successful completion of LS 640 and LS 644, and permission of the program director

LS 699	Independent Study	Student-selected investigation and/or experience in a setting or subject area related to student's program goals. Student will demonstrate the ability to plan and implement a special area of study related to his or her own graduate program and prepare an appropriate written and/or oral summary of the independent study experience.
LS 801	Research Project I	
LS 802	Research Project II	Research using the various techniques and resources available to measure performance improvement, test utilization, best practices and/or clinical outcomes. Students assess the laboratory's role in cost-effectiveness, access to laboratory testing and/or quality of laboratory methods. A written paper and oral presentation are required at the conclusion of the project.
LS 803	Contemporary Topics Research	This course aims to provide a solid foundation in conducting quality literature-based research at the graduate level in the fields of Medical Laboratory Science, Cytotechnology and Biotechnology. Emphasis will be placed on how to locate and make the best use of relevant sources, the development of an appreciation of scientific inquiry, and the development of skills needed in the creation of appropriate academic outputs (research proposal, journal quality articles).
LS 804	Experimental Research I	Experimental Research is a two-semester course series in which students will engage in experimental research under the tutelage of a Ph.D. level Primary Investigator either assigned by, or approved by the student's program-specific advisor. The research topic and scope of work will be program-specific and agreed upon by the advisor, primary investigator and student before the research begins.
LS 805	Experimental Research II	Experimental Research II is the conclusion of a two-semester course series in which students engage in experimental research under the tutelage of a Ph.D. level primary investigator either assigned by, or approved by the student's program-specific advisor. The research topic and scope of work as set forth during LS 404/804 will conclude with a summary of findings in the form of a research paper of publishable quality and participation in Sigma Xi Student Research Day.
LS 812	Practicum [Research Applications]	Internships in affiliated laboratories. Students rotate through all phases of laboratory work and functions. Components include practical work experience, participation in and/or observation of specialty area(s), quality assurance and continuing education activities, seminar attendance, and adjunct technologies.
LS 813	Practicum [Clinical Applications]	Internships in affiliated laboratories. Students rotate through all phases of laboratory work and functions. Components include practical work experience, participation in and/or observation of specialty area(s), quality assurance and continuing education activities, seminar attendance, and adjunct technologies.
LS 814	Practicum [Forensic Applications]	Internships in affiliated laboratories. Students rotate through all phases of laboratory work and functions. Components include practical work experience, participation in and/or observation of specialty area(s), quality assurance and continuing education activities, seminar attendance, and adjunct technologies.
LS 815	Practicum IV	Internships in affiliated laboratories. Students rotate through all phases of laboratory work and functions. Components include practical work experience, participation in and/or observation of specialty area(s), quality assurance and continuing education activities, seminar attendance, and adjunct technologies.
LS 816	Comprehensive Examination	
		Life Care Planning

JCRS 730	Introduction to Life Care Planning	The course will introduce learners to life care planning. Students will explore the history, content and methodology of life care planning. United States laws including the American Disability Act, Section 504 Rehabilitation Act of 1973, and Individuals with Disability Education Act, and the medical home will be examined, relative to the life care plan (LCP). Roles of LCP members will be described, and technology, home, vehicle modification and medical assessments will be discussed.
JCRS 731	A Primer on Catastrophic Injuries & Chronic Conditions for Life Care Planning	The course will provide an overview of common catastrophic injuries and chronic conditions addressed by the LCP. Students will examine etiologies, morbidity and mortality, secondary biopsychosocial outcomes of spinal cord injury, traumatic brain injury, traumatic limb loss, brachial plexus injury, stroke, burn injuries, and acquired progressive diseases such as orthopedic conditions, arthritis, pain, Parkinson's disease, low vision, and hard-of-hearing. Medical treatments, rehabilitation, habilitation and psychosocial assessments and interventions will be discussed. Implications on the life care plan will be illustrated.
JCRS 732	Specialty Topics in Life Care Planning	This course reviews basic statistical methods commonly used in clinical research and to estimate life expectancy, examines methods used to calculate predicted costs for projected needs on the life care plan, further elucidates the role of the economist in life care planning, explores ethics of life care planning, and examines the life care plan from a forensic and litigation perspective.
JCRS 733	Life Care Planning Practicum	This course serves as the practicum for the graduate certificate in Life Care Planning. Students will critique and develop a life care plan
MEDICAL IMAGING EDUCATION & MANAGEMENT		
RS 510	RS Research I	Introduces the key strategies and skills required to undertake research in the field of radiology. Includes the entire research process from writing a proposal and literature review, through data collection and analysis, to publication and presentation of research findings. Focuses on information literacy and critical evaluation of available research to assist in the development of evidence-based practice.
RS 520	RS Research II	Continuation of Radiologic Sciences 510, Research I. Introduces the key strategies and skills required to undertake research in the field of radiology. Includes the entire research process from writing a proposal and literature review, through data collection and analysis, to publication and presentation of research findings. Focuses on information literacy and critical evaluation of available research to assist in the development of evidence-based practice. Prerequisite: RS 510
RS 530	Radiologic and Imaging Science	This course represents an overview of all medical imaging and radiation sciences modalities.
RS 540	Program Management	Provides an orientation to academic program directorship, faculty and staff management, student affairs, faculty and academic affairs, the higher education system in the US, and how colleges and universities in the US work.
RS 550	Principles of Instruction	Focuses on principles and practice of effective pedagogy, curriculum development and evaluation in radiologic and imaging sciences.
RS 560	Program Accreditation	Presents topics such as outcome assessments, benchmarking, self-study preparation, applying for and maintaining accreditation and clinical affiliate site visits.

RS 570	US Healthcare System	This course provides an overview of how health care is organized, delivered (including quality issues), and financed (insurance, provider payment, and capital formation) in the United States. Traces the historical evolution in political, economic, and social contexts, including the distribution and access to medical and other services, the roles of public and private insurance for health care, and the structure of healthcare delivery mechanisms and providers. Addresses current issues in US healthcare organization, delivery, and financing as well as policies and approaches that impact changes in healthcare delivery. Compares and contrasts US approaches with respect to access, quality, and cost to those of other selected societies.
RS 580	Personnel Management	Introduces principles of management with emphasis on its applications in radiologic departments (radiology, radiation therapy, nuclear medicine) administration.
RS 590	Accreditation & Quality Management	Introduces principles of management with emphasis on its applications in radiologic departments(radiology, radiation therapy, nuclear medicine) administration.
RS 610	Advances Current Technology I	Presents new technologies and developments in the radiologic professions such as PET/CT, IMRT, PACS and 3D ultrasound.
RS 620	Advances in Current Technology II	Continuation of Radiologic Sciences 610, Radiologic and Imaging Sciences Current Technology I. Topics include teleradiology, integrated modalities and new developments and advances. The course is team taught by specialists in the field.
RS 630	Faculty Development	Introduces the meaning and concepts of serving as medical imaging and radiation sciences faculty. Topics include scholarship, advisement, teaching, faculty recruitment, retention and development.
RS 640	Financial Management	Introduces accounting and financial management as they apply to radiologic administration.
RS 650	Healthcare Law & Ethics	Course identifies and examines relevant substantive areas of business law and health care law that impact employers, employees and the operations of health care facilities and related businesses. Course provides a thorough understanding of the legal implications of running a health care business including the basic principles of law such as business law, torts, contracts, risk management, health care fraud, medical malpractice, ethical issues and regulatory compliance. Legal and accreditation issues impacting health care and the health information, HIPAA, confidentiality, privacy and security policies, procedures and monitoring, management professional are the focus of this course.
RS 660	Seminar	The final seminar series provides active participation in journal club activities where significant research products are discussed and evaluated through guided workshops. The seminar also provides a venue for formal sharing of either project or thesis with colleagues and faculty advisors.
RS 690	Capstone I	Research methods and information literacy content is geared to increase and disseminate intellectual inquiry, information literacy and the use of scholarly research methods. Specifically, a medical imaging and radiation sciences-related, practical project will be proposed by the student and approved by the course instructor. The project is presented in a public forum in the final semester of the program.
RS 691	Capstone II	Continuation of RS 690 Capstone Project I. Research methods and information literacy content is geared to increase and disseminate intellectual inquiry, information literacy and the use of scholarly research methods. Specifically, a medical imaging and radiation sciences-related, practical project will be proposed by the student and approved by the course instructor. The project is presented in a public forum in the final semester of the program. Prerequisite: RS 690

RS 692	Capstone III	Continuation of RS 691 Capstone Project II. Research methods and information literacy content is geared to increase and disseminate intellectual inquiry, information literacy and the use of scholarly research methods. Specifically, a medical imaging and radiation sciences-related, practical project will be proposed by the student and approved by the course instructor. The project is presented in a public forum in the final semester of the program. Prerequisite: RS 691
RS 699	Independent Study	A research project/special topics course taught in an independent study/seminar manner. Students will produce a written literature review paper and present research projects on topics agreed to by the instructor.
MEDICAL LABORATORY SCIENCE		
MLS 512	Clinical Microbiology I	Examines the biology of clinically significant bacteria. Emphasizes physiology and morphology of pathogenic bacteria and the key laboratory diagnostic tests used for their identification. Discusses pathogenic bacteria with respect to their associated clinical syndromes, epidemiology, mechanisms of infection, antimicrobial treatment and susceptibility testing. Contemporary laboratory methodologies used to examine clinical specimens are reviewed. Lecture and laboratory.
MLS 512	Clinical Microbiology I	Examines the biology of clinically significant bacteria. Emphasizes physiology and morphology of pathogenic bacteria and the key laboratory diagnostic tests used for their identification. Discusses pathogenic bacteria with respect to their associated clinical syndromes, epidemiology, mechanisms of infection, antimicrobial treatment and susceptibility testing. Contemporary laboratory methodologies used to examine clinical specimens are reviewed. Lecture and laboratory.
MLS 513	Clinical Microbiology II	Continuation of MT 312/512. Epidemiology, pathogenesis, laboratory diagnosis and treatment of the following classes of microorganisms: parasites, fungi, mycobacteria, Nocardia, Chlamydia, Rickettsiae, mycoplasma, spirochetes and virology. Uses contemporary laboratory methodologies and clinical correlations to examine prepared specimens and infectious processes. Lecture and laboratory. Prerequisite: MLS 312/512
MLS 523	Clinical Chemistry I	Study of the significance of chemical analytes indicative of human health and disease. Theory, operating principles and utilization of biochemical instrumentation and techniques for research in and testing of clinically significant analytes. Photometric and electrophoretic methodologies are used to test analytes including but not limited to carbohydrates, proteins, enzymes, lipids, drugs of abuse, therapeutic drugs and tumor markers. Quality control and preventive maintenance methods are emphasized. Lecture and laboratory.
MLS 524	Clinical Chemistry II	Continued study in the theory, operating principles and utilization of biochemical instrumentation and techniques for testing of clinically significant analytes, with correlation of test data to a patient's clinical status. Emphasis on the study of hormones, electrolytes, water metabolism, blood gases, renal, hepatic and pancreatic functions and nutrition. Lecture and laboratory. Prerequisite: MLS 323/523
MLS 541	Clinical Hematology I	Introduction to the hematopoietic system through study of the origin, development, and function of red blood cells, including normal physiology and metabolism of red cells. Normal and abnormal red and white blood cell morphology, and associated pathological findings are examined. Basic techniques employed in clinical hematology laboratories are taught and testing is performed on human blood samples. Introduction to blood collection techniques. Lecture and laboratory.

MLS 543	Clinical Hematology II	Continued study of the hematopoietic system through study of abnormal white blood cell morphology and associated pathological findings. Normal and pathologic conditions of the coagulation process are examined. Basic techniques employed in clinical hematology laboratories are taught and testing is performed on human blood samples. Students continue to practice blood collection techniques. Lecture and laboratory. Prerequisite: MLS 341/541
MLS 552	Immuno-hematology	Principles and protocols of modern transfusion services, covering blood typing, testing for antibodies and antigens, crossmatching, neonatal testing, and quality systems; immunology of hematologic diseases. Lecture and laboratory. Prerequisite: LS 331/531
MLS 575	Medical Laboratory Science Seminar	This seminar course is designed to allow students to evaluate their readiness to begin practicing as a medical laboratory scientist. Students explore personal and professional development related to transitioning into the medical laboratory science field. Topics include certification preparedness, resume writing, networking, interview and communication skills, and advocacy for the profession. Topics are covered through lectures, active learning activities, case studies, review questions, examinations, resume development and critique, and mock interviews.
MLS 576	Urinalysis and Body Fluids	This course provides the medical laboratory science student with foundational knowledge in urinalysis and body fluids. Basic anatomy and physiology of the urinary tract are reviewed with emphasis on urine formation. Physical examination, chemical analysis, and microscopic examination of urine and various body fluids are discussed. Renal, extrarenal, and other conditions and diseases as they relate to urinalysis and body fluid findings are examined. Lecture and laboratory.
MLS 812, 813, 814, 815	Medical Laboratory Sciences Practicum I (Clinical Hematology)	Graduate practical internships in clinical and/or research laboratories. Students participate in all phases of laboratory functions common to contemporary clinical laboratory practice including, but not limited to, microbiology (routine and specialized procedures in bacteriology, mycology, parasitology, virology and serology), chemistry (routine and specialized procedures in general chemistry, toxicology, therapeutic drug monitoring and chemical immunoassay), hematology (routine and specialized procedures in clinical hematology, coagulation and other biologic fluids), immunohematology (routine and specialized procedures in blood banking and transfusion medicine) and immunopathology (immunodiagnostics, serology). Students also participate in relevant continuing education activities and engage in other professionally-related activities. Prerequisite: Completion of pre-practicum medical laboratory science and core curriculum coursework
MLS 816	Comprehensive Exam	Self-administered review materials followed by a pass/fail comprehensive exam in the discipline-specific body of knowledge and scope of practice necessary to prepare for national certification examination(s). Prerequisite: Completion pre-practicum MLS and Core Curriculum coursework and the completion of at least two practicum courses.
MEDICAL TECHNOLOGY		
MT 512	Microbiology I	Examines the biology of clinically significant bacteria. Emphasizes physiology and morphology of pathogenic bacteria and the key laboratory diagnostic tests used for their identification. Discusses pathogenic bacteria with respect to their associated clinical syndromes, epidemiology, mechanisms of infection, antimicrobial treatment and susceptibility testing. Contemporary laboratory methodologies used to examine clinical specimens are reviewed. Lecture and laboratory.
MT 513	Microbiology II	Continuation of MT 312. Epidemiology, pathogenesis, laboratory diagnosis and treatment of the following classes of microorganisms: parasites, fungi, mycobacteria, Nocardia, Chlamydia, rickettsiae, mycoplasma, spirochetes and virology. Uses contemporary laboratory methodologies and clinical correlations to examine prepared specimens and infectious processes. Lecture and laboratory. Prerequisite: MT 312/512

MT 523	Chemistry I	Study of the significance of chemical analytes indicative of human health and disease. Theory, operating principles and utilization of biochemical instrumentation and techniques for research in and testing of clinically significant analytes. Photometric and electrophoretic methodologies are used to test analytes including but not limited to carbohydrates, proteins, enzymes, lipids, drugs of abuse, therapeutic drugs and tumor markers. Quality control and preventive maintenance methods are emphasized. Lecture and laboratory.
MT 524	Chemistry II	Continued study in the theory, operating principles and utilization of biochemical instrumentation and techniques for testing of clinically significant analytes, with correlation of test data to a patient's clinical status. Emphasis on the study of hormones, electrolytes, water metabolism, blood gases, renal, hepatic and pancreatic functions and nutrition. Lecture and laboratory. Prerequisite: MT 323/523
MT 531	Immunology	Examines the human immune system as it relates to health and disease. Topics include structure, function and generation of antibody molecules, and cellular recognition, response and regulation of the immune response. Mechanisms of hypersensitivity, autoimmunity, responses to microbiological agents especially viruses, HLA, transplantation and tumor immunology are covered. Principles and applications of diagnostic immunologic laboratory methods are discussed. Lecture and Laboratory. Lecture portion available online with permission of program director.
MT 541	Hematology I	Introduction to the hematopoietic system through study of the origin, development, and function of red blood cells, including normal physiology and metabolism of red cells. Normal and abnormal red and white blood cell morphology, and associated pathological findings are examined. Basic techniques employed in clinical hematology laboratories are taught and testing is performed on human blood samples. Introduction to blood collection techniques. Lecture and laboratory.
MT 543	Hematology II	Continued study of the hematopoietic system through study of abnormal white blood cell morphology and associated pathological findings. Normal and pathologic conditions of the coagulation process are examined. Basic techniques employed in clinical hematology laboratories are taught and testing is performed on human blood samples. Students continue to practice blood collection techniques. Lecture and laboratory. Prerequisite: MT 341/541
MT 552	Immuno-hematology	Principles and protocols of modern transfusion services, covering blood typing, testing for antibodies and antigens, crossmatching, neonatal testing, and quality systems; immunology of hematologic diseases. Lecture and laboratory. Prerequisite: MT 331/531
MT 574	Basic Clinical Techniques	
MT 575	MLS Seminar	
MT 576	Urinalysis and Body Fluids	
MT 812	Medical Technology Practicum I	
MT 813	Med Technology Practicum II	
MT 814	Med Technology Practicum III	
MT 815	Med Technology Practicum IV	

MT 816	Comprehensive Exam	
		MICROBIOLOGY (JCLS)
MI 500	Medical Micro-Immunol	The first part of the course is basic immunology taught by an interdepartmental teaching committee. The introduction to the basic principles of immune responses is followed by a consideration of the structure, function, and genetics of bacteria, viruses, fungi and animal parasites. Medically important microorganisms are studied in detail including their effects on the host, the diseases they cause, as well as therapy and control of the organism. Host-parasite interactions are emphasized throughout. The laboratory provides practical experience in the culture, isolation and identification of disease-causing organisms.
MI 505	Microbiology Biochemistry	The course is designed to teach the fundamental concepts of biochemistry as it applies to microorganisms. Students will become acquainted with the biochemical pathways involved in microbial metabolism. They will become familiar with the catabolic and anabolic pathways that are required for metabolism to occur and develop an understanding of the interrelationships between catabolism and anabolism that make microbial physiology possible. This course reflects a restructuring of the course content in MI 502 and MI 503, Biology of Microorganisms I and II and replaces them as a core course for entering students.
MI 514	Medical Parasitology	Through a series of lectures and laboratory sessions, students will become familiar with the medically important parasites, their life cycles, geographic distribution, methods of transmission, pathogenicity, selection of appropriate diagnostic laboratory specimens, and the technical procedures used for identification of parasites.
MI 520	Diagnostic Parasitology	This course familiarizes the students in the M.S. microbiology program with the medically important parasites. Students will use hypermedia computer assisted learning modules which include high resolution photographic images with overlays of descriptive text, illustrations and detailed textual information. Information on the following areas will be included in the computer learning program: lifecycle stages, geographical distribution, epidemiology and prevention, clinical characteristics, therapy for and pathogenesis of each of the medically important parasites. A variety of graphical menus and maps representing the life cycles of individual parasites are available to interested students. Laboratory sessions will be held so that students will become familiar with the technical procedures used for the identification of parasites and the selection of appropriate specimens for laboratory testing. Supplemental lectures will provide students with information from recent journal articles in the field covering such topics as immunology, antiparasitic drug therapy, and vaccine development.
MI 521	Intro to Immunology	The course introduces the students to the immune system as an adaptive defense system that recognizes invading pathogenic organisms and mounts a response to eliminate or neutralize foreign infectious agents. The students will be introduced to the molecules, the cells, and organs, and the processes involved in host defense against infection. An overview of basic principles, concepts, and techniques used to assess immune status will be presented.
MI 522	Vaccinology & Immunotherapeutics	Vaccines and immunotherapeutics are perhaps one of the greatest contributions of the scientific community to the prevention and control of infectious diseases. Nonetheless, their development and use relies and is influenced by a set of complex issues, including microbe-host interactions, the emergence and re-emergence of infectious diseases and economic and commercial concerns. This course will focus current topics in vaccines and immunotherapeutics in fighting disease. These topics will also be discussed in the context of global health considerations such as vaccine costs, cultural acceptance of immunization and adverse experiences that might prevent their effective utilization. The course will be a combination traditional lecture format, seminars, and Special Lecture Series by outside experts in the field of vaccine research, production, and public health.

MI 529	Laboratory Animal Science	
MI 530	Microbial Pathogenesis of Disease	Provides students with a framework of understanding of the complex set of interactions between bacteria and the hosts they colonize and infect. After completing this course, the students should be familiar with the myriad of mechanisms, physical and biochemical, that bacteria employ and the effects of these factors on their human hosts. This course should serve as the foundation for understanding the process of infectious diseases.
MI 531	Medical Virology	Fundamental concepts, emphasizing mechanisms and regulation of viral gene expression. Primarily discussion of literature. Students also attend JMC Microbiology lectures/Virology section.
MI 532	Medical Mycology	In depth discussions and laboratory study of the medically significant systemic, subcutaneous, cutaneous, superficial, and opportunistic mycoses. Emphasis will be given to a greater understanding of the morphological, physiological, and pathogenic characteristics of fungi.
MI 540	Microbiology of Antimicrobial and Antiviral Agents	The purpose of the course is to provide students with information on the action of antibiotics and chemotherapeutic agents at the molecular level. Students will be introduced to the strategies developed by cells to counteract the action of the antimicrobial agents. Through the use of lectures and demonstrations, students will be able to describe the basic methods for in vitro testing of antimicrobial agents.
MI 580	Principles of Epidemiology	This course is geared to familiarize the student with the most important determinants of population health and disease. Students learn to read and evaluate epidemiologic research papers and how to define, interpret, and calculate basic vital statistics and measures of disease.
MI 582	Diagnostic Microbiol	The purpose of the course is to introduce students to the fundamental elements underlying all subsequent learning in microbiology. These elements will be taught within the setting of medical microbiology. Learning microbiology within that format will give students the additional benefit of becoming familiar with the terms and constructs of clinical medicine.
MI 590	Intro Clinical Virology	Basic virology including structure of viruses and treatment and prevention of viral disease.
MI 590A	Intro Clinical Virology	Basic virology including structure of viruses and treatment and prevention of viral disease. MI 590A is the virology portion of MI 500.
MI 590B	Intro Clinical Virology B	Techniques used in clinical laboratories to isolate and identify viruses. Lecture and laboratory.
MI 600	Microbiology	This course provides students with an introduction to the field of microbiology. Lectures will focus on particular infectious agents and will discuss the pathogenesis, immunology, physiology, cell biology, pharmacology, and molecular biology of these organisms.
MI 610	Micro Teaching Experience	Supervised practice in teaching laboratory skills and data interpretation in a microbiology teaching laboratory. During the fall semester, students will spend four hours per week engaged in the laboratory classroom instruction of students enrolled in MI 500 and may be required to prepare and present a didactic lecture at a prelaboratory conference. Students will be assessed on their ability to present information in the laboratory setting, knowledge of the subject, critique of student assignments, bench-level teaching skills, use of audiovisual and other teaching materials, and didactic presentation.

MI 611	Molecular Virology	Current understanding of viral replication with emphasis on recent advances in biochemical technology leading to this understanding. Discussion of recent literature.
MI 613	Retroviruses	This course provides information about retroviruses at the biological and molecular level. Retroviruses have been extensively used as model system to understand the processes involved in the development of leukemia/lymphoma. The discovery of retroviruses associated with human diseases and the possibility of using retroviruses as gene therapy vectors further stimulated research on retroviruses in the last 15 years. A major thrust of this course is to stimulate thinking about retroviruses from an experimental, therapeutic, and diagnostic point of view.
MI 614	Biology/ Pathology-AIDS	HIV-1 is the most studied retrovirus in human history. This course will survey the molecular and cellular biology of HIV-1, the epidemiology and disease processes associated with infection, and the pathogenic mechanisms believed to mediate the various diseases associated with AIDS. The course will also consider current animal models as well as current and potential therapies such as antisense oligonucleotides and gene therapy.
MI 625	Contemporary Topics-Micro II	These courses deal in depth with a specific area of microbiology. Classes are chiefly student presentations and discussions under the guidance of the instructor. The courses may be repeated with a change of content.
MI 640	Research Rotation I	Supervised research in faculty laboratories. This course provides formal training in experimental design and laboratory methods by performing research rotations in the laboratories of different preceptors working on diverse problems in microbiology and molecular virology, and is a prelude to selection of a research advisor. Emphasis is placed on development and appreciation of experimental approaches to problems in the field, recording and interpretation of data and logical and lucid reporting of experimental results.
MI 650	Research Rotation II	Supervised research in faculty laboratories. This course provides formal training in experimental design and laboratory methods by performing research rotations in the laboratories of different preceptors working on diverse problems in microbiology and molecular virology, and is a prelude to selection of a research advisor. Emphasis is placed on development and appreciation of experimental approaches to problems in the field, recording and interpretation of data and logical and lucid reporting of experimental results.
MI 660	Research Rotation III	Supervised research in faculty laboratories. This course provides formal training in experimental design and laboratory methods by performing research rotations in the laboratories of different preceptors working on diverse problems in microbiology and molecular virology, and is a prelude to selection of a research advisor. Emphasis is placed on development and appreciation of experimental approaches to problems in the field, recording and interpretation of data and logical and lucid reporting of experimental results.
MI 670	Viral Morphogenesis	This course provides students with the opportunity to compare the different kinds of mechanisms involved in virus morphogenesis and to understand better the challenge that the structures of those mechanisms present to the development of effective treatment strategies.
MI 675	Vaccinology	This course provides a comprehensive survey of the various applied and developmental approaches towards vaccination against infectious organisms. Beginning with a detailed description of current vaccination strategies, the course extends into the rapidly moving field of vaccine development with discussion of novel technologies being studied for parenteral and oral vaccination including DNA-vaccines, bacterial and viral expression systems, delivery vehicles, and immunomodulation. The course provides an understanding of the nature of protective pre-exposure immunity as well as insight into approaches being used in an attempt to develop new strategies for immune intervention both prior to and following exposure to infectious agents.

MI 682	Advanced Diagnostic Microbiology	A seminar course dealing with contemporary issues in Clinical Microbiology. Such issues include the biology and nature of emerging agents of infectious disease, pathogenesis and disease spectrum of disease produced by such agents, epidemiology of disease produced by such agents, laboratory diagnosis of the agents, and therapeutic considerations. Additional issues include the need to maintain compliance with regulatory requirements and to achieve cost-effectiveness in the era of managed care and cost containment. A final issue is the ability of the microbiologist to present, in a clear and understandable fashion, such issues discussed above to fellow scientists, laboratory administrators, and laboratory clients.
MI 685	Neurovirology	This course addresses the basic scientific aspects of neurovirology and virus-induced neurologic disorders by providing the student with a thorough introduction to the molecular biology, pathogenesis, and sequelae of viruses that have an impact upon the nervous system. The introductory lecture focuses on the importance of neurotropic virus infections for public health. The objective of subsequent lectures is to familiarize the student with the mechanisms involved in the transmission, neuropathology, and immunopathology of virus-induced encephalopathies, as well as with the traits of specific acute and chronic viral infections of the central nervous system (CNS). Strong emphasis is placed on current developments in the field of neurovirology. In addition, students learn state-of-the-art methods used in the diagnosis of neurotropic virus infections, and become familiarized with the immunoprophylactic procedures currently used in the control of such diseases.
MI 689	Emerging Infectious Diseases	Topics for discussion are presented from the perspective of emerging disease as examples of species jumping, mutation, global transport, reemergence, etc. Each session is divided into a 1-hour presentation (initially led by the instructor) and a second hour of discussion. The discussion focuses upon an assigned reading topic from the text of an original journal article and may take a 'round robin' format, with different students commenting upon different aspects of the assigned reading. The final set of presentations and discussions are entirely student-led.
MI 711	Current Literature of Microbiology I	A weekly journal club in which students and faculty critically discuss papers in the current literature. Required for first and second year graduate students.
MI 718	Infectious Disease Rounds	For students specializing in clinical microbiology only. Clinical conference dealing with laboratory results in selected clinical cases, relating these results to the clinical and epidemiological features of the disease.
MI 721	Current Literature of Microbiology II	For students specializing in clinical microbiology only. Clinical conference dealing with laboratory results in selected clinical cases, relating these results to the clinical and epidemiological features of the disease.
MI 731	Current Literature of Microbiology III	A weekly journal club in which students and faculty critically discuss papers in the current literature. Required for first and second year graduate students.
MI 810	Laboratory Clerkship	To gain experience and proficiency in the clinical and/or research applications in microbiology, students will become familiar with state-of-the-art instrumentation and specialized research techniques in microbiology, immunology and/or molecular biology through placement in a clinical or research laboratory of the University or in an affiliate institution or their place of employment. The type of research laboratory and duration of training for this experience and hence the credit hours, will vary depending upon the student's prior experience, needs, and career goals.
MI 820	Master's Clerkship-MI	To gain experience and proficiency in the clinical and/or research applications in microbiology, students will become familiar with state-of-the-art instrumentation and specialized research techniques in microbiology, immunology and/or molecular biology through placement in a clinical or research laboratory of the University or in an affiliate institution or their place of employment. The type of research laboratory and duration of training for this experience and hence the credit hours, will vary depending upon the student's prior experience, needs, and career goals.

MI 830	Laboratory Clerkship	To gain experience and proficiency in the clinical and/or research applications in microbiology, students will become familiar with state-of-the-art instrumentation and specialized research techniques in microbiology, immunology and/or molecular biology through placement in a clinical or research laboratory of the University or in an affiliate institution or their place of employment. The type of research laboratory and duration of training for this experience and hence the credit hours, will vary depending upon the student's prior experience, needs, and career goals.
MI 870	Research-MS Microbiology	The traditional laboratory research-based MS thesis option requires six (6) credits of research. Students, working under the supervision of a research advisor and a thesis committee will formulate research questions, record, and analyze the research data. Presentation of completed research will be made by students in a public forum prior to graduation. In addition to this traditional completion option of the laboratory or bench-based research path, a new Capstone Option, also requiring six (6) credits is offered which will require independent study and research integrated within a Capstone Project. The culminating Capstone Project will result in a formal scholarly work reflecting integration of the scientific knowledge and technical and management skills learned in the program through didactic course work focused in an area chosen jointly by the student and the Capstone Advisor with the approval of the Program Director. The Capstone Project will be supervised by a Capstone Project Committee. In much the same manner as a traditional laboratory research thesis, the final Capstone Project thesis document will be approved by a Capstone Committee, presented publicly and defended as would a laboratory research thesis.
MI 880	Master's Research-MI	The traditional laboratory research-based MS thesis option requires six (6) credits of research. Students, working under the supervision of a research advisor and a thesis committee will formulate research questions, record, and analyze the research data. Presentation of completed research will be made by students in a public forum prior to graduation. In addition to this traditional completion option of the laboratory or bench-based research path, a new Capstone Option, also requiring six (6) credits is offered which will require independent study and research integrated within a Capstone Project. The culminating Capstone Project will result in a formal scholarly work reflecting integration of the scientific knowledge and technical and management skills learned in the program through didactic course work focused in an area chosen jointly by the student and the Capstone Advisor with the approval of the Program Director. The Capstone Project will be supervised by a Capstone Project Committee. In much the same manner as a traditional laboratory research thesis, the final Capstone Project thesis document will be approved by a Capstone Committee, presently publicly and defended as would a laboratory research thesis.
MI 890	Research-MS Microbiology	The traditional laboratory research-based MS thesis option requires six (6) credits of research. Students, working under the supervision of a research advisor and a thesis committee will formulate research questions, record, and analyze the research data. Presentation of completed research will be made by students in a public forum prior to graduation. In addition to this traditional completion option of the laboratory or bench-based research path, a new Capstone Option, also requiring six (6) credits is offered which will require independent study and research integrated within a Capstone Project. The culminating Capstone Project will result in a formal scholarly work reflecting integration of the scientific knowledge and technical and management skills learned in the program through didactic course work focused in an area chosen jointly by the student and the Capstone Advisor with the approval of the Program Director. The Capstone Project will be supervised by a Capstone Project Committee. In much the same manner as a traditional laboratory research thesis, the final Capstone Project thesis document will be approved by a Capstone Committee, presented publicly and defended as would a laboratory research thesis.

MI 910	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
MI 920	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
MI 930	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
MIDWIFERY		
MIDW 610	Antepartum Care	This course examines the fundamentals of prenatal care, including the components of prenatal care, criteria for assessing perinatal outcomes and the application of the midwifery management process in the antepartum period. Theoretical foundations for diagnosis and dating of pregnancy, common discomforts of pregnancy, assessment of pelvic adequacy and assessment of fetal well-being and nutrition in pregnancy are covered in depth.
MIDW 611	Intrapartum Care	This course teaches the principles of midwifery for the laboring woman and her family, correlating physiologic processes to the maternal and fetal experiences of labor and birth. Concepts of normal birth and its variations lead to thoughtful analysis of management options.
MIDW 612	Postpartum/ Newborn Care	This course develops the knowledge base for assessing the physical and emotional changes of the postpartum period, breastfeeding, early attachment and parenting behaviors. It provides the knowledge base for understanding the physiology of transition to extrauterine life and early newborn adaptations. Assessments for newborn health, gestational age and attachment behaviors are included.
MIDW 613	Embryology and Genetics	This hybrid and on-campus course will cover basic concepts of genetics, including inheritance and genetic disorders. Concepts of embryology will include fertilization, implantation and the embryonic period.
MIDW 619	Advanced Perinatal Pathophysiology	This course examines the fundamentals of perinatal care of complex client(s) in the antepartum intrapartum, postpartum and newborn periods. Students will utilize course materials to simulate and problem-solve written cases in a virtual midwifery practice. Midwifery management discussions and peer review will include a variety of topics of frequently seen complications in the perinatal period.
MIDW 631	Clinical I Well Woman & Maternity I	The course consists of supervised clinical practice in the midwifery management of uncomplicated antepartum and well-woman clients needing routine primary care, care for common gynecologic problems and contraception. Students learn consistent and accurate use of the midwifery management process with emphasis on subjective and objective data collection and beginning assessment and plan development. An on-campus skills workshop prepares students for this clinical course and includes risk assessment, development of a needs assessment and problem list, and pertinent hand skills. Additionally, history taking and physical assessment will be reviewed and demonstrated. Microscopy skills will be introduced. Contraceptive techniques will be reviewed.

MIDW 632	Clinical Midwifery in Ambulatory Settings II	The course consists of supervised clinical practice in the midwifery management of uncomplicated antepartum and well-woman clients needing routine primary care, care for common gynecologic problems and contraception. Students are expected to continue to demonstrate consistent and accurate use of the midwifery management process with emphasis on independent development of an assessment, plan for, and evaluation of, care. This course is three credits and consists completely of continued clinical practice in the midwifery management of uncomplicated antepartum and well woman clients needing routine primary care, care for common gynecologic problems and contraception.
MIDW 632	Clinical Full Scope Midwifery Care I	The course consists of supervised clinical practice in the midwifery management of uncomplicated antepartum and well-woman clients needing routine primary care, care for common gynecologic problems and contraception. Students are expected to continue to demonstrate consistent and accurate use of the midwifery management process with emphasis on independent development of an assessment, plan for, and evaluation of, care. This course is three credits and consists completely of continued clinical practice in the midwifery management of uncomplicated antepartum and well woman clients needing routine primary care, care for common gynecologic problems and contraception.
MIDW 633	Clinical III: Full-Scope Midwifery	This clinical course adds supervised clinical practice in the care of uncomplicated intrapartum, postpartum and newborn clients. Students learn consistent and accurate use of the midwifery management process with emphasis on subjective and objective data collection and beginning assessment and plan development in the care of intrapartum clients. Management of patients experiencing complications/emergencies requiring consultation/referral will be included. Emphasis is also placed on facilitating breastfeeding, positive family bonding, and management of newborns within their families.
MIDW 634	Clinical Full Scope Midwifery Care II	Consists of supervised clinical practice in fullscope midwifery care in a student role. Students manage uncomplicated and complicated clients needing primary care, gynecologic, intrapartum and perinatal care. Students continue to demonstrate consistent and accurate use of the midwifery management process with emphasis on independent assessments, planning, implementation and evaluation of care, consultation and referral.
MIDW 635	Basic Skills in Health Care	Basic Skills in Health Care This course is an introduction to common health care skills and knowledge used in clinical practice. Presentation of self as care provider to diverse clientele with respect for human rights is emphasized. Contents include but are not limited to vital sign measurement and interpretation, infection control, sterile technique, wound care, urinary catheterization, venipuncture, fetal and uterine external monitoring application, emergency response procedures, therapeutic presence and communication, and skills in team building and patient advocacy. Medical terminology, written and electronic medical records and basic laboratory assessments will be reviewed. Practice and successful return demonstration of selected skills will be done at the student's first on campus experience after completion of this course.
MIDW 635L	Basic Skills for Healthcare Lab	During this one-week intensive laboratory course, students review, practice and demonstrate selected basic health care skills for midwifery practice such as vital sign measurement, sterile technique, bladder catheterization, medical terminology, documentation of care and presentation of self as a clinician with faculty guidance and feedback for skill development. Students in this laboratory course participate in hands-on practice using task trainers and simulated patient care scenarios to build beginning competency. Corequisite: MIDW 635

MIDW 635L	Basic Skills in Health Care Lab	During this one week on-campus intensive laboratory course, students review, practice and demonstrate selected basic health care skills for midwifery practice such as vital sign measurement, sterile technique, bladder catheterization, medical terminology, documentation of care and presentation of self as a clinician with faculty guidance and feedback for skill development. Students in this laboratory course participate in hands-on practice using task trainers and simulated patient care scenarios to build beginning competency.
MIDW 636	Environments of Health Care	The effects of various environments of care on social dynamics between health care providers and patients will be explored. Theories of stress and coping and shared leadership will be addressed. Environments examined will include: home, office/clinic, hospital/health care institution, and care in place ? disaster/emergency care. Available resources in each environment and the evidence supporting their use or misuse will be discussed. Observational clinical experiences in a variety of environments will be described and analyzed via reflective journals and asynchronous seminar discussion. Midwifery role and scope of practice in the various environments will be highlighted. Identifying local health care providers and resources for future practice referrals situates midwifery care in a system which provides for needs of women and their families ranging from simple to complex.
MIDW 637	Health & Illness in Clinical Practice	This course will examine concepts of health and illness at various stages of human development. The midwifery model of care and the midwifery management process will be introduced as frameworks guiding care practices. Wellness care and complementary integrated approaches will be discussed. Selected common health alterations at every life phase will be explored, with emphasis on the midwife's role for independent or collaborative management or referral. The plan of care for these clients ? including further testing or assessment, therapeutics and educational needs - will be examined. Problem based learning scenarios will serve as the stimulus for identifying learning needs and developing midwifery care strategies.
MIDW 638	Advanced Pharmacology I	This course is a comprehensive course in pharmacology for womens health care. The language of pharmacology and the principles of pharmacodynamics and pharmacokinetics serve as the foundation for the course. Major classifications of agents that are covered in the course include: hormones, antimicrobials, analgesia and anesthesia, over-the-counter drugs. Prescriptive writing, including legal and ethical aspects, is covered as well. At the completion of this course, students will have advanced knowledge in pharmacology.
MIDW 640	Prep for Full Scope Practice	Preparation for Full Scope Midwifery Practice This on-campus course explores issues in midwifery practice including: the role, rights and responsibilities of the midwife in the clinical practice setting; the legal, ethical and financial realities of professional midwifery practice; alternatives in full scope midwifery care with examples from experts; and environments of midwifery care including home, hospital and birth center settings. Students take a closer look at one birth center model of childbearing care by spending time on site. Content covered in this visit includes: 1) the history, philosophy and development of the birth center movement in the United States and 2) the accreditation and needs assessment process.
MIDW 641	Preperation for Office Based Practice	This on-campus intensive course focuses on building the office-based clinical skills a midwife requires to successfully communicate with and care for clients. Clinical decision making and use of the midwifery management process is emphasized. Hand skills as well as interviewing and counseling skills are reinforced during laboratory simulation. Clinical microscopy and laboratory result interpretation are practiced. Skills for building trust and demonstrating respect for clients are woven throughout. Expectations for clinical rotations are reviewed.
MIDW 642	Professional Issues	This course is designed to provide an appreciation of the history and critical issues in midwifery, as well as health care in the United States in general. This course will also increase appreciation of the variety of roles that a midwife can play and aid in understanding rights and responsibilities as a midwifery health care provider.

MIDW 643	Advanced Physiology & Pathophysiology Primary Care	This course focuses on human physiology and pathophysiology and the application of these principles in the primary care of women. Anatomical and physiological principles necessary for health care professionals are reviewed. Normal and abnormal structures and processes underlying health and disease are explored with connections made to assessment and diagnosis in the clinical setting. Midwifery management of common primary care conditions across the health span is presented and explored.
MIDW 644	Advanced Pharmacology II	Prepares the midwife to provide appropriate drug therapy to women during pregnancy, intrapartum, and the postpartum period as well as to the newborn. Changes in pharmacodynamics and pharmacokinetics during pregnancy and in the neonatal period are reviewed. A general knowledge of pharmacotherapeutics is applied to the treatment of a variety of conditions during pregnancy, including hyperemesis, gestational diabetes, and urinary tract infections. The course also explores the use of vitamin and mineral supplementation throughout a woman's lifetime.
MIDW 645	Reproductive & Sexual Healthcare	This course presents basic principles and application of well woman care across the life span. Reproductive anatomy and physiology is reviewed. Sexuality, menstrual cycle function/dysfunction, common gynecological conditions and problems, and family planning are common threads in this course. Midwifery management of gynecologic conditions, from routine care to more complex problems, is explored.
MIDW 646	Midwifery Nexus Project	As the culminating project for your basic midwifery education, this course provides a framework for students to further develop a particular area of interest relevant to midwifery practice emphasizing active, collaborative engagement with real world problems. Consistent with the definition of practice used by the American College of Nurse-Midwives (2011) for advanced midwifery education, this final project encompasses not only clinical care, but also education, policy, administration, and research. Each student will dialogue with faculty to develop and execute a final project that will contribute to the profession of midwifery.
MIDW 699	Advanced Health Assessment	This course presents the knowledge and skills for primary health care providers to complete a thorough and sensitive comprehensive history and physical examination on a client, with emphasis on the midwifery role. A professional approach to the development of the provider-client relationship is introduced. A methodical sequence to history taking, systems review and symptom appraisal is described. Assessment of the physical signs of health and health alterations is reviewed. Special populations, cultural variations and age-related issues across the life-span are considered. Selected diseases and disorders seen in primary care are explored for their manifestations found in a history and physical assessment. Clinical reasoning, critical decision-making, and the midwifery management process are emphasized and practiced. At the completion of this course, students will have advanced knowledge and skills in health assessment.
MIDW 712	Introduction to Health Policy	This required course focuses on federal health-policy development, analysis and implementation. The emphasis is on the role of the health-care provider in influencing health policy in the United States. The student will study public health policy to understand the basics of the policy-making process and to attain a beginning knowledge of how to influence health policies. The course will focus on women's and infants' health issues as examples of broader issues in health policy.
MIDW 722	Introduction to Clinical Administration	This elective course provides students with the knowledge to understand the factors that influence the success and viability of midwifery practices. The effects of the changing health care environment on primary health care providers will be explored. Particular attention will be paid to current issues in the health care system. The course will examine the startup of a clinical practice either as an entrepreneurial entity or within an existing organization. Emphasis will be placed on a beginning understanding of financial accounting statements and business plans used in the health care industry. Students will explore the influence of political/economic milieus within and around the practice organization. In addition, students will learn practical techniques in order to develop beginning abilities in conflict resolution and contract negotiation.

MIDW 723	Advanced Clinical Practice	This elective course is a guided independent study in advanced clinical practice. In consultation with the faculty, the student will identify a specific area of clinical practice (for example, caring for women with gestational diabetes). Intensive, focused study in this content area will be facilitated. Experiences relevant to the student's area of interest will be sought in the clinical setting. Reflection on the student's own transformation from novice to expert will be included.
MIDW 724	Intro to Teaching Methods	This elective course introduces teaching methods useful for midwifery educators in academic and clinical settings. Fundamentals of adult education will be reviewed. Concepts particular to midwifery education will be explored. Examination of how to identify and reach educational goals will be included for all teaching environments: traditional classrooms, distance education modalities, and clinical settings. The process of identification of student learning issues and problem solving will be included. The past, present, and future of midwifery education will be explored.
MIDW 725	Reproductive Healthcare in Global Contexts	This elective course will present current trends and the range/impact of problems in reproductive health in low-income countries around the world. Students will explore the context and consequences of reproductive health problems, common intervention strategies, and the critical role of health care consultants to low-income countries. The class will gain an understanding of the appropriate preparation, roles, and responsibilities of international health care consultants. As an outcome of this course, the student will be prepared to predict the potential impact of unmet reproductive health care needs in lowincome countries and evaluate proposed interventions.
MIDW 726A	SL-Reproductive Health in Global Contexts	This international excursion course will enhance student learning and contribute to global effortsto improve maternal-infant health. The experience will include travel in a foreign country. Travel length will vary from 1 week to several weeks. The course includes pre-travel preparation and assignments that will encourage reflection and facilitate the development of leadership skills and cultural humility. All students will be supervised by TJU faculty during their travel experience.
MIDW 726B	SL-Reproductive Health in Global Contexts	This international excursion course will enhance student learning and contribute to global efforts to improve maternal-infant health. The experience will include travel in a foreign country. Travel length will vary from 1 week to several weeks. The course includes pre-travel preparation and assignments that will encourage reflection and facilitate the development of leadership skills and cultural humility. All students will be supervised by TJU faculty during their travel experience
MIDW 730	Theoretical Foundations of Midwifery	This on-line course provides an overview of health promotion and counseling from theoretical and applied perspectives. The midwifery model of care will be introduced. We will discuss how the health of women and their families are influenced by a variety ofoffactors. We will study theories of wellness and behavior change and explore public health and the role of the midwife. The development of graduate-level writing skills will be emphasized.
MIDW 731	Evidence-Based Care:Eval Research	This required course provides the foundations of research and critical inquiry as it applies to the evaluation of scientific evidence. This course covers the following areas: the scientific method and its limitations; ethics of research; defining problems, questions, and hypotheses; conceptual analysis, constructs and theories as they pertain to clinical practice and research. The course will provide an overview of research methods and process, and the students will apply this knowledge in the preparation of a literature review relevant to midwifery practice. Midwifery contributions to the scientific literature will be highlighted as examples.
MIDW 800	Current Issues in Midwifery & Women Health	Students will explore current issues in midwifery and situate their doctoral project in these contexts. Current national and global agendas in midwifery translational research, education, clinical practice, and policy will be explored in depth. Students will consider emerging issues in healthcare, educations, and practice that can guide the formation of the AIM project statement of purpose.

MIDW 801	Aim Workshop I	Students will engage in an iterative process to generate clear doctoral project statements informed by course discussion, readings, and individual student goals to contribute to the advancement of midwifery. By the conclusion of this course, students will write an AIM project question in a framework approved by faculty, based on analysis of current issues in midwifery and women's health and grounded in the hallmarks of midwifery.
MIDW 802	Aim Workshop II	This course is designed to help students advance their work related to their AIM project. Through course discussion, readings, and individual work, students will refine their doctoral project statement, understand the influence that place and setting may have on the development and implementation of their project, and develop skills they need to promote their project to their key stakeholders.
MIDW 803	Aim Workshop III	This course is designed to help students advance their work related to their AIM project. Through committee feedback, readings, and mentored individual work, students will finalize their doctoral project statement, create an operational plan for their project, and finalize their review article related to their AIM project.
MIDW 804	Aim Workshop IV	This course is designed to help students complete their work related to their AIM project. With committee feedback and mentored individual work, students will implement and complete their doctoral Advances in Midwifery (AIM) project.
MIDW 805	Organizational Change	This course introduces students to the principles of organizational change and applies these principles to real world experiences. This courses focuses on helping students understand how to integrate systems thinking into an analysis of the human, organizational, and social objectives within various types of health care organizations. It also examines how organizations assist or impede the development of healthcare quality or safety improvement initiatives and how organizations adapt or do not adapt to change.
MIDW 806	Aim Workshop V	This course is designed to help students analyze, synthesize, and write up the results of their completed AIM Project conducted during AIM Workshop 4. With committee feedback and mentored individual work, students will use appropriate qualitative and quantitative methods to describe the results of their doctoral Advances in Midwifery (AIM) project and situate their results into the body of evidence relevant to their topical area.
MIDW 807	Data Driven Midwifery & Womens Healthcare	Increasingly midwives and other health care providers must demonstrate the value of their work. In this class you will become familiar with various electronic means to collect practice-level data and how to analyze it to support innovative practice. You will also use publicly available electronic data to inform health care practice, education, policy and advocacy, or administration. This is a required course for Doctorate of Midwifery students. It is open to graduate students within Jefferson with permission of the instructor.
MIDW 808	Health Policy Analysis: Part I	The focus of this course is health policy development, analysis and implementation and the role of the health care provider in influencing health policy. The student will study public health policy to understand the policymaking process and to attain knowledge of how to influence health policies. The course will focus on women's and infants' health issues as examples of broader issues in health policy. This course is the first of a two-part sequence of courses on Health Policy required for Doctorate of Midwifery Students. This course is open to other students in Jefferson with permission of the instructor.
MIDW 809	Health Policy Analysis: Part II	The focus of this course is to delve deeply into health policy development, analysis and implementation and the role of the health care provider in influencing health policy. The student will complete a health policy analysis on an issue related to Women's Health. This course is the second of a two-part sequence of courses on Health Policy required for Doctorate of Midwifery Students, who will complete the health policy analysis project started in DMW 808 Health Policy Analysis 1 in an area related to their AIM project. This course is open to other students at Jefferson who are interested in health policy in women's health with permission of the instructor.

MIDW 810	Epidemiology for Midwifery & Womens Health	Epidemiology is the science of public health. In this course, students will acquire tools they can use to analyze public health problems and clinical research. These will include measures of women's and infants' health particularly relevant to midwifery including infant mortality, pregnancy-related mortality, and pregnancy-related morbidity; characteristics of health screening tests; and an understanding of such basic epidemiologic concepts as the epidemiologic transition and life course epidemiology. We will use these tools to analyze causes of racial and ethnic disparities in maternal and newborn health and begin to explore potential solutions.
MIDW 811	Leadership in Midwifery Health	This is a 2 credit online course limited to students in the doctoral program in Midwifery. Students will explore a variety of leadership theories and styles and differentiate leadership from management. The inter-relationship of power and influence will be considered as well as the impact of gender, culture and race on leadership. Using case studies, students will apply theory and research to become effective healthcare leaders in real world contexts. The theoretical foundation from this course will be utilized in the further development of the AIM project.
MIDW 812	Professional Communication	The most innovative and successful clinical, public policy, or research projects are of limited value if their methods and results are not disseminated for others to learn from and emulate. Students will develop skills to effectively convey results from their AIM topic to the broader community. Through the course, weekly writing exercises will refine scholarly and professional writing skills. We will discuss in depth writing for two common types of publications, the literature review and the research article, and also discuss the basics of professional presentations. At the end of the course students will present the literature review for their AIM topic, both orally and as a written article.
MIDW 813	Case Studies in Midwifery Clinical Administration	The profession of midwifery is fulfilling work, because it addresses women's needs, hopes, and dreams. However, many midwives work in situations in which they lack autonomy and feel unable to provide high quality midwifery care, or else are satisfied and effective but work more hours for lower levels of pay. In this course we will explore various models of midwifery practice to identify effective staffing, compensation, and organizational structures. We will explore alternative payment mechanisms for midwifery practice that include outcomes as well as, or in place of, volume. We will address the interplay of ethical, financial and clinical issues in effective practice leadership.
MIDW 814	Aim Workshop VI	This course is designed to help students disseminate the results of their AIM project. With committee feedback and mentored individual work, students will create two products, a publishable paper and a poster presentation, that describe the results of the AIM project.
MIDW 815	Grant Writing	Incorporating best practices into care is expensive and time-consuming. Often funding is needed to get access to the resources and administrative support needed to integrate innovative cutting-edge practices. This course is designed to help students understand the grant writing process and to be able to find, write, and submit grants to support their work.
MIDW 821	Project Design and Methods	Midwives in leadership must respond to changing health care landscapes. Addressing health disparities, incorporating new technologies, or creating systems of care require health professionals to create and integrate innovative practices through successful project design and execution. Doctoral project design requires setting clear and measurable goals, objectives, and outcomes; understanding the culture, needs, and resources of the community and/or organization where the project will be carried out. This course will give doctoral students the skills needed to design and execute a variety of project approaches when crafting their Advances in Midwifery (AIM) project. Through course discussion, readings, and individual work, students will understand multiple methods of project design, develop skills needed to successfully design achievable projects that are responsive to contextual factors; and create a project statement which will become the framework for their AIM project.

MIDW 822	AIM Operations Workshop	This course is designed to help students complete their work related to their AIM project. With committee feedback and mentored individual work, students will implement and complete their doctoral Advances in Midwifery (AIM) project.
MIDW 823	AIM Implementation Workshop	This course is designed to help students complete their work related to their AIM project. With committee feedback and mentored individual work, students will implement and complete their doctoral Advances in Midwifery (AIM) project.
MIDW 824	AIM Implementation Workshop	This course is designed to help students complete their work related to their AIM project. With committee feedback and mentored individual work, students will implement and complete their doctoral Advances in Midwifery (AIM) project.
MIDW 825	AIM Dissemination Workshop	This course is designed to help students complete their work related to their AIM project. With committee feedback and mentored individual work, students will implement and complete their doctoral Advances in Midwifery (AIM) project.
MIND-BODY MEDICINE		
MBM 500	Foundations in Mind-Body Medicine	This first course in this certificate will introduce the necessary framework for developing a patient-centered approach for integrating mind-body therapies and recommendations based on the latest data. This course will include a review of current evidence for topics in mind-body medicine such as roles of various modalities in the treatment of mental health issues, pain management, and stress-related problems. Practical integration of these practices into the office visit will also be covered in this course.
MBM 510	Advances in Mindfulness-Based Stress Reduction	Mindfulness-Based Stress Reduction (MBSR) is one of the seminal interventions driving the growth of applications of mindfulness and other contemplative disciplines for the promotion of physical and psychological wellness within the context of the emergent field of mind/body medicine. This course provides a didactic overview of stress physiology, the influence of stress on disease processes, and the substantial evidence-based research that has documented the numerous health benefits of MBSR and other mindfulness-based interventions. The course includes the practice of formal mindfulness techniques in weekly sessions. The total experience is intended to promote personal and professional wellness and to create a foundation for further exploration of mindfulness-based interventions for those interested in integrating mindfulness into their professional practice.
MBM 520	Advanced Mind-Body Practice: The Neuro-Emotional Technique	This third course in the certificate will provide basic training in NET, including rationale, review of evidence, and outcomes data. This course will explore various patient populations, addressing diverse mind-body problems, and the mind-body continuum. Students will learn diagnostic evaluation methods as well as an understanding of acupuncture and physical medicine with opportunities to practice muscle testing and the steps of NET. Prerequisite: MBM 500 & MBM 510
MODEIM, SIMULATION, DATA ANALYTICS		
MSDA 600	Systems Modeling I	This course introduces the mathematical tools and techniques necessary to visually represent complex systems as a series of interconnected elements and numerically simulate dynamic system behavior using modern simulation software in order to develop insights into complex system behavior. In this course, the Stella software package will be used to assist in modeling, simulating, analyzing and interpreting the behavior of complex dynamic systems.

MSDA 620	Systems Modeling II	This course advances the mathematical tools and techniques introduced in MSDAX---600 by practicing the visual representation of complex systems and the numerical simulation of dynamic system behavior using modern simulation software in order to develop insights into complex system behavior. In this course, the Stella software package will be used to assist in modeling, simulating, analyzing and interpreting the behavior of complex dynamic systems. Prerequisite: MSDAX 600
MSDA 700	Analytical Modeling I	This course introduces mathematical tools and techniques and applied mathematics principles associated with quantitative analytical modeling. In this course, the Mathematica software package will be used in the development, solution and interpretation of quantitative mathematical models. Prerequisite: MSDAX 620
MSDA 720	Systems Modeling I	This course advances the mathematical tools and techniques introduced in MSDAX---700 by practicing the applied mathematics principles associated with quantitative analytical modeling. In this course, the Mathematica software package will be used in the development, solution and interpretation of quantitative mathematical models. Prerequisite: MSDAX 700
MOLECULAR BIOLOGY		
MB 452	Practicum: Clinical Application	
MB 453	Practicum: Research Applic	
MB 454	Practicum: Forensic Application	
NEUROLOGY		
NEUR 350	Neurology Clerkship	Neurology is a four-week clerkship which provides a foundational experience in the field of Adult Neurology. Student will learn about various neurologic conditions, including pathophysiology, clinical presentation, diagnosis, and treatment. Learning will specifically focus on ability to gather a detailed neurological history performing a neurological examination. Offered at Thomas Jefferson University Hospital and affiliate locations. (4 week clerkship)
NEUR 352	Neurology Selective	
NEUR 355	Neurology Clerkship	
NEUR 401	Senior Clerkship	
NEUR 425	Research- Neurology	Departmental research is scheduled after consultation with the department and approval of a research project. Students may complete up to 12 credits (or 8 weeks) of research in Phase 3. Students wishing to count their research project towards the SI requirement in Phase 3, must receive permission from the SI Director and complete a capstone project.
NEUR 430	Advanced Topics in Neurology	This course explores a wide-range of topics in neurology as a baseline framework for a potential future start in training in neurology. This course utilizes a combination of readings, podcasts, online cases, lectures, and participation in resident lectures. Graded P/F.

NEUR 481	Neurology Elective	
NEUROSCIENCE		
NS 530	Neuroanatomy	This is a graduate level course incorporating lectures, laboratories and case discussions that are designed to introduce students to the organization and function of the human nervous system. The course objective is to provide students with an overall appreciation of human functional neuroanatomy. The course utilizes a regional approach that includes overviews of the organization of the structure and function of human central nervous system components including the spinal cord, brainstem, diencephalon, basal ganglia, cerebellum, and cortex, as well as sensory and motor systems and higher integration.
NS 601	Profiles in Neuroscience Research	Prior to the selection of a research advisor for the thesis project, students spend time in laboratories of program faculty, discussing the ongoing research projects and conduction experiments. Students will become familiar with the background literature for the research area and acquire expertise in laboratory techniques.
NS 610	Research Rotation in Neuroscience	Prior to the selection of a research advisor for the thesis project, students spend time in laboratories of program faculty, discussing the ongoing research projects and conduction experiments. Student will become familiar with the background literature for the research area and acquire expertise in laboratory techniques.
NS 616	Neuroscience Journal Club I	The Neuroscience Journal Club provides a forum for a structured review of extramural research ongoing in the field of Neuroscience. The current format allows for presentations from all members of the TJU neuroscience community, from Professor to technician, from Clinical Neurologist to Neurosurgeon. Students will be required to present once each semester and will receive feedback collected from the faculty at each presentation, one on one with a faculty member afterwards. This journal club is an excellent forum for students with interest in Neuroscience to get exposed to a diverse range of topics to observe experienced presenters, and finally to get valuable constructive criticism to help improve their presentation skills. Like the seminar series, the journal club is open to all TJU students, faculty and staff.
NS 620	Research Rotation in Neuroscience	Prior to the selection of a research advisor for the thesis project, students spend time in laboratories of program faculty, discussing the ongoing research projects and conduction experiments. Student will become familiar with the background literature for the research area and acquire expertise in laboratory techniques.
NS 625	Fundamentals of Viral Infection & Disease	The course will provide students with an introduction to the field of viral infections in the central nervous system including a small laboratory component that provides exposure to fundamental experimental approaches in the field of neuroscience and virology. Students will acquire know- ledge of a variety of CNS infections, pathology of diseases and experimental methods in neurovirology.
NS 626	Neuroscience Journal Club II	The Neuroscience Journal Club provides a forum for a structured review of extramural research ongoing in the field of Neuroscience. The current format allows for presentations from all members of the TJU neuroscience community, from Professor to technician, from Clinical Neurologist to Neurosurgeon. Students will be required to present once each semester and will receive feedback collected from the faculty at each presentation, one on one with a faculty member afterwards. This journal club is an excellent forum for students with interest in Neuroscience to get exposed to a diverse range of topics, to observe experienced presenters, and finally to get valuable constructive criticism to help improve their presentation skills. Like the seminar series, the journal club is open to all TJU students, faculty and staff.
NS 630	Research Rotation in Neuroscience	Prior to the selection of a research advisor for the thesis project, students spend time in laboratories of program faculty discussing the ongoing research projects and conduction experiments. Student will become familiar with the background literature for the research area and acquire expertise in laboratory techniques.

NS 636	Neuroscience Journal Club III	The Neuroscience Journal Club provides a forum for a structured review of extramural research ongoing in the field of Neuroscience. The current format allows for presentations from all members of the TJU neuroscience community, from Professor to technician, from Clinical Neurologist to Neurosurgeon. Students will be required to present once each semester and will receive feedback, collected from the faculty at each presentation, one on one with a faculty member afterwards. This journal club is an excellent forum for students with interest in Neuroscience to get exposed to a diverse range of topics, to observe experienced presenters, and finally to get valuable constructive criticism to help improve their presentation skills. Like the seminar series, the journal club is open to all TJU students, faculty, and staff.
NS 650	Topics Neuroscience: Synaptic Transmission	This course provides an in depth examination of synaptic transmission. The topics covered include works that underpin our understanding of synaptic transmission and plasticity, as well as current areas of intense research interest. The course will begin with a focus on reading seminal papers that gave rise to our understanding of synaptic transmission over the last 50 years. Highlights are papers by Dr. Katz and Reese that defined the foundation of current thinking on synapse transmission. The course requires a background in basic neuroscience. The course consist of twice a week discussions of primary literature. Students are expected to read and be able to discuss the assigned papers. The overall goal is to provide students with the tools to critically read primary literature and assimilate new information.
NS 690	Neuro-pharmacology	This course, in conjunction with "Principles of Clinical Pharmacology", is to provide graduate students with basic knowledge in pharmacology and an understanding of how therapeutic and non-therapeutic drugs affect functions of the central nervous system (CNS). The neuropharmacology course will provide (1) a general overview of the biochemical and electrical properties of CNS; (2) in-depth information on neurotransmitters and their effector systems; and (3) clinical implications of the neurotransmitter systems. Emphasis will be placed on how neurons function and communicate at the molecular and system levels.
NS 700	Intro to Neuroscience	Cellular Neurophysiology is a four-credit graduate core course designed to help students understand the basic mechanisms of electrical excitability and cellular neurobiology at an INTERMEDIATE level. The first half of the oourse mainly focuses on physical, electrical and biochemical principles that explain fundamental properties of the nervous system. The second half of the course is mainly devoted to cellular and molecular properties of the nervous system. The subjects of this portion of the course allow application of principles learned in the first half of the course to gain an integral understanding of neural science. The course objectives are achieved through didactic lectures, homework assignments and a problem-solving session. Prerequisite:: GC 550 and/or permission from course director. Students are expected to have basic knowledge of algebra, electromagnetism and the structure and functon of the neuron.
NS 710	Seminar: Neuroscience	This course exposes graduate students to current topics in neuroscience with oral presentations from faculty from within or outside the university. Students matriculated into the neuroscience graduate program are required to register for the neuroscience seminar. However, the seminar is open to all TJU students, faculty and staff. This seminar series is an excellent forum for students with interst in neuroscience to get exposed to a diverse range of topics, to observe experienced presenters, and network with TJU neuroscientists as well as invited speakers.
NS 712	Basic Neuropathology	This is a graduate lecture course that is designed to intro- duce students to concepts in pathogenesis, etiology pathology and clinical features of disease affecting the human nervous system. The course will cover the most common diseases affecting the brain and peripheral nervous system, providing an overview of human neuropathology. The emphasis will be on active acquisition of knowledge through independent study of the course textbook and full participa- tion in class and course activities. Case Studies are included to provide clinico-pathological correlations and stimulate visual learning using gross and microscopic examples of disease. In addition, these programs will provide an understanding of the clinical relevance of the major topics under discussion.

NS 715	Molecular Cellular Neuroscience	<p>the combination of didactic lectures and journal article based discussions. An emphasis will be placed on approaches used to investigate questions in several general ideas, including developmental neuroscience, cellular signaling, second messengers and the molecular genetic basis of behavior and disease. Lectures and discussion of primary literature expand on and deepen understanding in particular areas of molecular and cellular neuroscience introduced Neuro I. In addition a section on molecular genetic control of neurologic function and behavior will introduce new concepts and approaches to the study of neuronal dysfunction and disease. The inclusion of primary literature in the course promotes an understanding of analytical approaches to questions in neuroscience as well as critical scientific thinking. The primary literature also makes more accessible to students many of the techniques used in molecular and cellular neuroscience. Moreover the combination of didactic and discussion sessions for each topic allows the integration of knowledge acquisition with an analytical assessment of experimental molecular and cellular neuroscience.</p> <p>Prerequisite: GC550 or permission from the course director</p>
NS 720	Seminar: Neuroscience	<p>This course exposes graduate students to current topics in neuroscience with oral presentations from faculty from within or outside the university. Students matriculated into the Neuroscience Graduate Program are required to register for the Neuroscience Seminar. However, the seminar is open to all TJU students, faculty and staff. This seminar series is an excellent forum for students with interest in Neuroscience to get exposed to a diverse range of topics, to observe experienced presenters, and network with TJU neuroscientists as well as invited speakers</p>
NS 725	Translational Neuroscience	<p>This course familiarizes students with current topics in clinical neuroscience and to provide students with fundamental knowledge of the neurobiology underlying central nervous system diseases. A detailed presentation of the current clinical approaches to treating specific nervous system disorders will be presented. Faculty will discuss basic neuroscience studies that have been successfully implemented in the clinical setting. At the conclusion of the course, students will be poised to more clearly formulate novel hypotheses for the improvement, treatment and prevention of central nervous system disorder. Research papers with a clinical focus or research topics pertaining to translational types of approaches will be discussed. The course presumes that students have already taken an introductory course in neuroscience such as "Introduction to Neuroscience"(course number NS700)</p>
NS 730	Seminar: Neuroscience	<p>This course exposes graduate students to current topics in neuroscience with oral presentations from faculty from within or outside the university. Students matriculated into the Neuroscience Graduate Program are required to register for the Neuroscience Seminar. However the seminar is open to all TJU students, faculty, and staff. This seminar series is an excellent forum for students with interest in neuroscience to get exposed to a diverse range of topics, to observe experienced presenters, and network with TJU neuroscientists as well as invited speakers.</p>
NS 735	Clinical Mentorship Neuroscience	<p>This individualized tutorial will combine Thomas Jefferson University's strength in clinical neuroscience by giving doctoral level graduate students engaged in basic neuroscience research research access to the experience and perspective of clinical neuroscience faculty mentors. Each student will meet on a weekly basis with a member of a selected TJU's clinical faculty (e., Psychiatry, Neurology, or Neurosurgery) to discuss topics and emerging ideas in clinical neuroscience. The schedule will be determined by the clinical mentor and the graduate student. Where possible, the student will be offered opportunities to observe the clinical activities of the mentor.</p>
NS 740	Applied Statistics in Neuroscience	<p>This course serves as a graduate level introduction into applied data analytic strategies focused in the neurosciences. An understanding of hypothesis testing, the relationship of design and analysis, and the interpretation of statistical tests of significance will be strongly emphasized. Methods for collecting and organizing study data, including an introduction to data analytic software such as SPSS and SAS, will be discussed. The ultimate objective of the proposed course is to provide graduate level neuroscience students will sufficient skill to independently enact various forms of data analysis.</p>

NS 745	Advanced Topics Neuro-degenerative Disease	
NS 910	Research: Neuroscience	With the guidance and supervision of a member of the neuroscience graduate program faculty and a thesis research committee, the student will develop a research project and acquire the necessary technical expertise to conduct the research project. Research time towards the completion of a doctoral thesis will occupy a dominant part of the students time in more advanced years of study.
NS 920	Research: Neuroscience	With the guidance and supervision of a member of the neuroscience graduate program faculty and a thesis research committee, the student will develop a research project and acquire the necessary technical expertise to conduct the research project. Research time towards the completion of a doctoral thesis will occupy a dominant part of the students time in more advanced years of study.
NS 930	Research: Neuroscience	With the guidance and supervision of a member of the neuroscience graduate program faculty and a thesis research committee, the student will develop a research project and acquire the necessary technical expertise to conduct the research project. Research time towards the completion of a doctoral thesis will occupy a dominant part of the students time in more advanced years of study.
NURSING		
NU 560	Advanced Pharmacotherapeutic	A practical examination of select topics in contemporary pharmacotherapeutics. Emphasizes rational decision-making skills in the selection of drug therapy. Considers the social, economic and emotional impact of drug therapy.
NU 570	Pathophysiology of Human Disease/ Pathologic Aspects of Disease	Covers topics in general and systemic pathology, providing an overview of major aspects of human pathology and the pathophysiology of major diseases.
NU 590	Diagnostic Reasoning and Clinical Decision-Making for Women's Health Care Nurse Practitioner I	Introduces the women's health care nurse practitioner student to the conceptual basis for meeting the health promotion and maintenance needs of the well woman, pregnant mother, and the postpartum well woman. Prepares the student to contribute, support and work collaboratively with other health care team members in meeting the health needs of this group. Requires 224 hours of clinical practicum with a preceptor.
NU 591	Diagnostic Reasoning and Clinical Decision-Making for Women's Health Care Nurse Practitioner II	Addresses the conceptual basis for meeting the health promotion and maintenance needs of the infertile woman and the high risk pregnant woman. Prepares the student to contribute, support and work collaboratively with other health care team members in meeting the health needs of this group. Requires 224 hours of clinical practicum with a preceptor.
NU 592	Diagnostic Reasoning and Clinical Decision-Making for Women's Health Care Nurse Practitioner III	Addresses the conceptual basis for meeting the health promotion and maintenance needs of women with gynecological disorders. This course will prepare the student to contribute, support and work collaboratively with other health care team members in meeting the health needs of this group. Requires 224 hours of clinical practicum with a preceptor.
NU 602	Health Policy, Legal and Ethical Dimensions of Practice	Introduces graduate health profession students to the legislative process at the national, state and local levels. Emphasizes increasing awareness of and examination of the healthcare delivery system. Explores issues and trends associated with healthcare policy development and their implications.

NU 603	Research for Advanced Practice Nursing I	Prepares advanced practice nurses to be proficient in the utilization of research including the evaluation of research and identification of researchable problems within the clinical practice setting. Examines the theoretical bases and reasoning for advanced practice nursing in order to enhance critical thinking and scientific inquiry. Explores the use of measurement and data collection techniques, statistical techniques and procedures, analysis of qualitative and quantitative data, and reporting, interpreting and evaluating research outcomes.
NU 604	Research for Advanced Practice Nursing II	Prepares advanced practice nurses to be proficient in the utilization of research and evidence-based practice in order to guide clinical and organization decision-making, practice change, and quality care delivery and patient outcomes.
NU 605	Role of the Advanced Practice Nurse	Explores the role and practice of the advanced practice nurse as expert clinician, educator, consultant, collaborator, researcher, and administrator. Examines the historical, social, political, philosophical, and economic forces that have and continue to influence the role and practice of advanced practice nursing. Enables graduate students to become knowledgeable about the role of the advanced practice nurse as a member and leader of the healthcare team.
NU 607	Transforming Health Care Delivery: A Systems Perspective for Innovation	This course examines systems theories and the principles of systems thinking as a framework for understanding the dynamic changes occurring in health care. Thinking and acting from a systems perspective enables leaders to focus on the future: innovating and transforming to meet the changing needs of patients, the workforce, and their communities. Key current and emerging health care trends will be explored. Principles and practices for leading innovation and methods for developing and evaluating ideas for operational redesign, new products and services will be introduced.
NU 608	Leadership and Management for Operational Excellence	This course provides students a balanced mix of theory, evidence-based strategies, and practical skills as they strive to embed the principles of high reliability and safety, operational excellence, and continuous process improvement in their organizations. This includes not only excellence in providing quality, safe health care, but in execution of key business strategies to meet the organization's targets for productivity, costs and other key performance indicators. Financial management systems for decision-making are explored, as are processes and tools for achieving cost-effective, quality outcomes.
NU 609	Health Economics, Finance, and Policy	This course examines the foundational concepts and principles underlying the current and historical financial, social, economic, and political structures that shape health and health care delivery in the United States. Students will analyze the impact of economic, political, social, and regulatory policies and incentives on health care cost, access, quality, outcomes, and value from the perspectives of consumers, providers of services, insurers, and payers. Emerging issues will be explored with an emphasis on students acquiring the skill to argue and illustrate the value of nurses' work, on outcomes, cost and value and on the ethical development of supporting payment systems that enable nurses to make essential contributions to improving care and outcomes for diverse populations.
NU 610	Strategic Communication in the Workplace	This course examines key concepts of communication theory and practice helping students become more effective, confident, and ethical leaders. Students reflect upon their own distinctive set of interpersonal communicative styles and behaviors and that of others, while exploring strategies to effectively communicate whatever the situation, audience, or message. Ultimately, the course helps students adapt their communication in a way that motivates others to excel, cultivates working relationships and alliances and fosters a deeper sense of organizational engagement.

<p>NU 611</p>	<p>Leadership Practicum and Seminar I</p>	<p>This course includes the first of two field placements and accompanying faculty-led seminars that will provide students with opportunities to gain practical leadership/management experience in health care settings and health influencing environments. Students will work under the direction and supervision of a faculty member and a mentor in an environment where the student advances leadership skills through problem-solving, decision-making, communication, change management, systems thinking, and innovation. Students contribute to the functioning of the health care agency and complete and present the results of an agency-designated project(s) during the practicum. All aspects of practicum will be completed under the supervision and/or approval of the preceptor and/or course instructor in individual practicum placement in addition to an accompanying online seminar that will allow reflection and professional development based upon the individual experiences of students.</p>
<p>NU 612</p>	<p>Leadership Practicum and Seminar II</p>	<p>This course includes the second of two field placements and accompanying faculty led seminars that will provide students with opportunities to gain practical leadership/management experience in health care settings and health influencing environments. Students will work under the direction and supervision of a faculty member and a mentor in an environment where the student advances leadership skills through problem-solving, decision-making, communication, change management, systems thinking, and innovation. Students contribute to the functioning of the health care agency and complete and present the results of an agency-designated project(s) during the practicum. All aspects of practicum will be completed under the supervision and/or approval of the preceptor and/or course instructor in individual practicum placement in addition to an accompanying online seminar that will allow reflection and professional development based upon the individual experiences of students.</p>
<p>NU 613</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Psychiatric Mental Health Nurse Practitioner I</p>	<p>This course will examine how nurse practitioners can work with adults experiencing psychiatric illness and behavioral health concerns. The first half of the course will focus on critical skills central to the role of the psychiatric mental health nurse practitioner, including communication, diagnosis, documentation, and assessment. Particular emphasis will be placed on foundational knowledge, skills, and resources necessary for the nurse practitioner to care for a general adult population at periods of symptom exacerbation, throughout life transitions, and throughout older adulthood. This foundational course will further examine the development of the therapeutic relationship with the individual, the use of various therapies for treatment, and the use of pharmacological intervention when needed. Students in the course will additionally be exposed to individualized cognitive behavioral therapy, group treatment, inter- disciplinary collaboration, and system level interventions. This course will employ the structure of DSM-5 diagnoses, using them as a guiding framework for treatment, but will expand case conceptualization beyond DSM diagnosis. The bio-psycho-social formulation and evidence based practice will be emphasized.</p>
<p>NU 614</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Psychiatric Mental Health Nurse Practitioner II</p>	<p>This course will examine how nurse practitioners can work with individuals and families with children experiencing psychiatric illness and behavioral health concerns. Particular emphasis will be placed on foundational knowledge, skills, and resources necessary for the nurse practitioner to care for these patients throughout their developmental trajectory, at times of symptom exacerbation, and at the time of transition to adult services. This course will further examine the development of the therapeutic relationship with the child/adolescent and family, the use of various therapies for treatment, and the use of pharmacological intervention when needed. Students in the course will additionally be exposed to group treatment, inter-disciplinary collaboration, and system level interventions. This course will employ the structure of DSM-5 diagnoses, using them as a guiding framework for treatment, but will expand case conceptualization beyond DSM diagnosis. The bio-psycho-social formulation and evidence based practice will be emphasized.</p>

<p>NU 615</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Psychiatric Mental Health Nurse Practitioner III</p>	<p>This course will examine how to work with vulnerable/special populations and deeply explore role/scope issues related to entry to practice for the psychiatric mental health nurse practitioner. The first half of the course will focus on advanced skills in therapeutic communication and psychopharmacology. Emphasis will be placed on building upon skills from the first and second semester, specifically in advanced diagnostic assessment, family therapy, and complex medication management. This course will further prepare the student for transition into practice by increasing skills in decision making to improve outcomes, use of evidence based practice, career development, and professionalism. This course will continue to employ the structure of DSM-5 diagnoses, using them as a guiding framework for treatment, but expanding upon case conceptualization beyond the DSM-5. The bio-psycho-social formulation and evidence based practice will continue to be</p>
<p>NU 625</p>	<p>Epidemiology for the Health Professions</p>	<p>Applies the concepts, principles and uses of epidemiology in health care. Emphasizes population-based collection and analysis of health data and its relationship to health services. Analyzes application of epidemiological methods to infectious and chronic diseases.</p>
<p>NU 630</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Adult Care Advanced Practice Nurse</p>	<p>Focuses on the comprehensive management of acute and chronic complex health problems experienced by adults. Incorporates principles for health promotion, health maintenance and disease prevention into the therapeutic regime. Addresses gynecological care of women. Emphasizes complex illnesses and multisystem illness of the cardiovascular, pulmonary, neurological, renal, gastrointestinal systems, infectious disorders and nutritional disorders. Incorporates concepts of cost effectiveness and efficacy, quality and care management into the plan of care. Requires 224 hours of clinical practicum with a preceptor.</p>
<p>NU 631</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Acute Care Advanced Practice Nurse I</p>	<p>Introduces students to the care of patients who experience surgical intervention. Focuses on the integration of core and support course content into the assessment, diagnosis and management of health and illness conditions seen in adult patients in the hospital setting. Clinical practicum is required concurrently. Requires 224 hours of clinical practicum with a preceptor.</p>
<p>NU 632</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Acute Care Advanced Practice Nurse II</p>	<p>Introduces students to the role of the acute care advanced practice nurse in managing the health care of chronically ill patients who are hospitalized. Focuses on the integration of core and support course content into the assessment, diagnosis and management of chronic health problems in adult patients through a conceptual approach. Clinical practicum is required concurrently. Requires 224 hours of clinical practicum with a preceptor.</p>
<p>NU 633</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Acute Care Advanced Practice Nurse III</p>	<p>Introduces students to the management of patients who are experiencing critical illness or injury. Focuses on the integration of core and support course content into the assessment, diagnosis and management of patients with life threatening illness. Clinical practicum is required concurrently. Requires 224 hours of clinical practicum with a preceptor.</p>
<p>NU 640</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Pediatric Advanced Practice Nurse I</p>	<p>Introduces the conceptual basis for meeting the health promotion and maintenance needs of diverse pediatric populations and their families. Prepares the student to assume the role of a healthcare provider, and to contribute and support the collaborative responsibility to other healthcare members in meeting the healthcare needs of children from birth through young adulthood. Requires 224 hours of clinical practicum with a preceptor.</p>
<p>NU 641</p>	<p>Diagnostic Reasoning and Clinical Decision-Making for Pediatric Advanced Practice Nurse II</p>	<p>Introduces the conceptual basis in assessing, diagnosis, and managing the care of diverse pediatric populations with acute health problems in partnership with their families and coordinated across healthcare delivery systems. Prepares the student to assume the role of healthcare provider and to contribute and support the collaborative responsibility to other healthcare members in meeting the care needs of with chronic conditions from birth through young adulthood. Requires 224 hours of clinical practicum with a preceptor.</p>

NU 642	Diagnostic Reasoning and Clinical Decision-Making for Pediatric Advanced Practice Nurse III	Introduces the conceptual basis in assessing, diagnosing, and managing the care of pediatric populations with common chronic conditions in partnership with their families and coordinated across healthcare delivery systems. Prepares the student to assume the role of healthcare provider and to contribute and support the collaborative responsibility to other healthcare members in meeting the care needs of children with chronic conditions from birth through young adulthood. Requires 224 hours of clinical practicum with a preceptor.
NU 643	Emergency Nurse Practitioner Role / Emergency Care I	This course will provide an overview of the role of advanced practice nursing in emergency care settings. The focus is on the assessment and management of individuals across the lifespan seeking emergency care. Students will utilize evidence-based screening, differential diagnosis, and management skills of health problems, including pharmacological and non-pharmacological treatment modalities in a culturally appropriate manner. Students will have the opportunity to utilize classroom, lab, clinical experiences, and evolving leadership skills in selected emergency care practicum settings. Successful completion of both the didactic and clinical components of the course with a grade of 80% or higher is necessary to pass the course.
NU 644	Emergency Nurse Practitioner Procedures /Emergency Care II	This course will focus on increasing knowledge and technical proficiency important in the provision of emergency care by nurse practitioners. The course provides a comprehensive introduction to the skills and procedures necessary to provide safe and effective emergency and urgent care. Through online modules, lectures, and skill development students will recognize when and under what conditions a procedure or intervention is needed for the management of a patient with a specific diagnosis. In addition, students will practice in an emergency care setting. This course will support the development of leadership skills for nurse practitioners who intend to practice in these areas. Students will fulfill the necessary practicum hours for the course and practice skills in a safe learning environment with faculty and preceptors.
NU 645	Collaborative Management / Advanced Emergency Care III	This course will focus on increasing knowledge and technical proficiency important to the provision of advanced emergency care by nurse practitioners in a collaborative emergency care environment. The course provides the future emergency nurse practitioner (ENP) the opportunity to increase knowledge and practice procedures necessary to provide safe and effective advanced emergency and urgent care. Through online modules, lectures, and skill development, students will build upon emergency nurse practitioner skills important for the management of a patient with a specific diagnosis, mass casualty situation, and disaster care. Students will have the opportunity to build leadership skills and communication skills to prepare them for leadership roles within emergency medicine departments and hospital systems. Students will fulfill the necessary practicum hours for the course and practice skills in a safe learning environment with faculty and preceptors.
NU 662	Diagnostic Reasoning and Clinical Decision-Making for Neonatal Nurse Practitioner I	Introduces the conceptual basis for meeting the health promotion and maintenance needs of the normal pregnant mother and the normal neonate and the high risk pregnant mother and the high risk neonate. Prepares students to assume the role of a care provider, and to contribute and support the collaborative responsibility of other healthcare members in meeting the health needs of the pregnant mother with prenatal care and neonates at birth. Includes concepts, theories and research related to health promotion, health maintenance and prevention of illness and injury of epidemiological significant problems. Integrates core and support course content as well as the use of critical thinking and diagnostic reasoning skills to provide an in-depth focus on assessment, diagnosis and management of primary healthcare needs. Requires 224 hours of clinical practicum with a preceptor.

NU 663	Diagnostic Reasoning and Clinical Decision-Making for Neonatal Nurse Practitioner II	Addresses the conceptual basis for meeting the health promotion and maintenance needs of the normal pregnant mother and the normal neonate and the high risk pregnant mother and high risk neonate. Presents common variations in pregnancy and neonates. Prepares students to assume the role of a care provider, and to contribute and support the collaborative responsibility of other healthcare members in meeting the health needs of the pregnant mother with prenatal care and neonates at birth. Includes concepts, theories and research related to health promotion, health maintenance, and prevention of illness and injury of epidemiological significant problems. Integrates core and support course content as well as the use of critical thinking and diagnostic reasoning skills will allow for an in-depth focus on assessment, diagnosis and management of primary healthcare needs. Requires 224 hours of clinical practicum with a preceptor.
NU 663	Diagnostic Reasoning and Clinical Decision-Making for Neonatal Nurse Practitioner II	Addresses the conceptual basis for meeting the health promotion and maintenance needs of the normal pregnant mother and the normal neonate and the high risk pregnant mother and high risk neonate. Presents common variations in pregnancy and neonates. Prepares students to assume the role of a care provider, and to contribute and support the collaborative responsibility of other healthcare members in meeting the health needs of the pregnant mother with prenatal care and neonates at birth. Includes concepts, theories and research related to health promotion, health maintenance, and prevention of illness and injury of epidemiological significant problems. Integrates core and support course content as well as the use of critical thinking and diagnostic reasoning skills to provide an in-depth focus on assessment, diagnosis and management of primary healthcare needs. Requires 224 hours of clinical practicum with a preceptor.
NU 664	Diagnostic Reasoning and Clinical Decision-Making for Neonatal Nurse Practitioner III	Focuses on the management of the high-risk neonate. Prepares students to assume the role of a care provider, and to contribute and support the collaborative responsibility of other healthcare members in meeting the health needs of the high-risk neonate and family. Includes concepts, theories and research related to management of care and prevention of complications, as well as health promotion, health maintenance and prevention of illness and injury of epidemiological significant problems. Integrates core and support course content as well as the use of critical thinking and diagnostic reasoning skills to provide an in-depth focus on assessment, diagnosis and management of healthcare needs. Require 224 hours of clinical practicum with a preceptor.
NU 665	Comprehensive Assessment for Clinical Decision-Making for the Mother and the Neonate	Refines and expands upon prior health assessment skills including comprehensive history taking, development and psychosocial assessment and recognition of pathological changes as well as variations of normal. Stresses the development of clinical decision-making skills, taking into consideration life circumstances, economic, cultural and developmental variations. Emphasizes taking a detailed problembased history of the mother, physical assessment of the neonate and the development of case presentation skills and charting. Students learn to differentiate, interpret and document normal and abnormal findings.
NU 667	Advanced Pharmacotherapeutics for Neonatal Nurse Practitioners	Designed to meet the needs of nurses in advanced practice who are eligible for prescriptive privileges. Provides a comprehensive and clinically pertinent analysis of pharmacokinetics and pharmacodynamics of selected agents. Emphasizes the pharmacotherapeutic agents commonly uses in the intensive care nursery, delivery room and in high-risk follow-up of the neonate. Discusses medication for the pregnant woman with a preexisting condition prior to pregnancy or during pregnancy. Critically analyses mechanisms of action, bioavailability, adverse effects, toxicities, cultural, social and economic aspects of pharmacodynamics, which are used as a foundation for clinical decision-making.
NU 672	Informatics for Advanced Nursing Practice	Introduces the present and potential impact of information technology on nursing systems and other healthcare systems. Emphasizes the role of the computer in supporting the roles of caregiver, administrative/financial case manager and patient educator in a variety of healthcare settings. Provides both the knowledge base and the skills necessary to utilize this technology effectively.

NU 673	Comprehensive Assessment for Clinical Decision-Making	Prepares students to obtain and interpret data for development of a plan of care for clients throughout the life span. Students demonstrate proficiency performing a physical examination on a healthy individual. Emphasizes taking a comprehensive health history, performing physical assessment, interpreting data to determine differential diagnosis and accurately and concisely recording pertinent data. Introduces the role of the nurse practitioner, family theory principles and cultural beliefs used in clinical decision-making.
NU 674	Management of Common Health Problems in Primary Care	Introduces principles of health promotion and disease treatment and prevention for young and middle age adults. Addresses common alterations in adult health treated in the primary care setting. Requires 224 hours of clinical practicum with a preceptor.
NU 675	Management of Women and Children in Ambulatory Care	Presents principles of primary care emphasizing health promotion and disease treatment and prevention for the child from birth through adolescence and for women. Explores Family Systems theory and concepts that are pertinent to the practice of the nurse practitioner. Requires 224 hours of Clinical practicum with a preceptor.
NU 676	Management of the Adult and Older Adult in Ambulatory Care	Focuses on the complex issues relating to the management of the health status of adults and older adults in primary care settings. Integrates the distinct role of the nurse practitioner as a primary care provider and patient advocate into the client-provider-family partnership in the management of chronic illness. Requires 224 hours of clinical practicum with a preceptor.
NU 678	Academic Nursing Seminar I:Facilitating Learner-Centric Development and Socialization	This course introduces the teaching and learning process in nursing education and provides a forum for analysis of the role of nurse educators in preparing students to develop values and behaviors essential to practice. Students will explore learning theories, principles, and innovative teaching strategies for diverse learners in a variety of settings, with an emphasis on the learner-centered philosophy. Academic performance of students will be discussed.
NU 680	Academic Nursing Seminar II:Contemporary Curriculum Design and Role Execution Practicum	This course emphasizes models and issues of curriculum design, implementation and evaluation processes used in nursing education. Learners will analyze course sequencing, competency leveling, and the influence of the institution, practice and program standards, and accreditation requirements into the curriculum. Additionally, students will collaborate with their preceptors to explore the role of the faculty member. Students are expected to facilitate a learning session under the guidance of, and in collaboration with, a preceptor as an application in how curriculum design guides teaching and learning.
NU 681	Community Systems Administration I	Provides an overview of factors related to advanced population-based nursing with a focus on national health priorities and assessment strategies. Requires 225 hours of clinical practicum with a preceptor.
NU 682	Community Systems Administration II	Focuses on the population-based nursing and public health concepts and theories that assist in providing interventions that improve the health of specific population subgroups. Require 225 hours of clinical practicum with a preceptor.
NU 684	Academic Nursing Seminar III: Measuring Learning Outcomes and Role Execution Synthesis	This course culminates in the synthesis of role behaviors specific to the academic nurse educator and presents strategies for assessing and evaluating student learning outcomes. Qualities of effective measurement and assessment instruments will be presented with a focus on test construction, analysis and other evaluation measures for the classroom and clinical areas. Additionally, students will collaborate with their preceptors to explore the role of the faculty member. Students are expected to develop an evaluation measurement of a didactic course or clinical course under the guidance of, and in collaboration with, a preceptor.

NU 685	A Case-Based Approach to the Diagnosis and Pathophysiology of Headache Disorders	This course focuses on primary and secondary headache disorder diagnosis and pathophysiology. The first unit will focus on common primary and secondary headache diagnosis based on the accepted classification system: the International Classification of Headache Disorders 3rd edition. Participants will gain an understanding of how to use this classification criteria, as well as learn how to conceptualize its advantages and disadvantages. This unit will also discuss key features of the physical exam. The second unit will discuss when to use diagnostic testing modalities such as brain imaging and interpretation of their results. The third unit will provide an overview of the pathophysiology of migraine, trigeminal autonomic cephalalgias, tension-type headache, and cranial neuralgias.
NU 686	Current and Emerging Treatments and Procedural Skills for Headache Disorders	This course focuses on the treatment of primary and secondary headache disorder diagnosis. Unit IV will cover current and emerging outpatient pharmacological preventive and acute treatment options. This unit will also discuss medication overuse headache. Unit V will discuss the use of other treatment modalities, including neuromodulation devices and procedural interventions such as nerve blocks. This unit also focuses on emergency room, outpatient, and inpatient infusion treatment programs and highlights aspects of a multidisciplinary treatment approach. Unit VI will provide details on select primary and secondary headache disorders that have unique treatment approaches, such as spontaneous intracranial hypotension, painful lesions of the cranial nerves and face pain, and hypnic headache, among others. Finally, Unit VII will provide an overview on how to incorporate psychological and behavioral assessment and treatments into the management of headache disorders.
NU 687	Psychological Factors in Headache Medicine with Intro to Business Management	This short course will provide practical information on office, billing, and revenue management for a headache medicine practice.
NU 689	Healthcare Informatics: Ethics, Issues and Trends	Focuses on legal, professional, ethic and moral issues in healthcare informatics. Examines the role of technology and its impact on society centering on privacy. Information ownership and information sources. Looks toward the “high reliability” organization. Discusses the future implications related to healthcare technology and learning.
NU 690	Nursing/ Healthcare Informatics: Project Management	Explores the tools and resources utilized by the Information Technology Team to track information problems, tasks and a variety of projects. Utilizes selected project management skills and applications to enhance the mastery of content.
NU 691	Healthcare Economics and Financial Management for Nurses	Provides an overview of health economics, fundamentals of insurance and managed care. Enables students to build and develop budgeting and financial analysis skills, culminating in the ability to combine budgeting and financial analysis in writing a business plan and grant proposal.
NU 693	Nursing Informatics Seminar and Practicum I	Provides an overview of information management and technology in a variety of patient care settings. Incorporates concepts of cost effectiveness and efficacy, quality and care management. Students assist in planning fieldwork experiences that support and facilitate the course materials. Requires 225 hours of clinical practicum with a preceptor.
NU 694	Nursing Informatics Seminar and Practicum II	Facilities application of the principles of critical thinking with system(s) thinking across the healthcare organization. Utilizes problem solving associated with the role of nursing informatics and a variety of perspectives. Emphasizes organization systems, clinical systems, fiscal and operational systems, and evaluation. Students assist in planning fieldwork experiences that support and facilitate the course materials. Requires 225 hours of clinical practicum with a preceptor.

NU 696	Leadership and Critical Decision Making	This course will focus on the knowledge and skills required for nursing and healthcare delivery to prompt practice excellence. Emphasis will be placed on leadership rationale and systems leadership as means to promote high quality and safe patient care. The aim of this course is to prepare a graduate to provide quality cost-effective care, to participate in the implementation of care, and to assume a leadership role in the management of human, fiscal, and physical healthcare resources
NU 699	Independent Study	Provides an opportunity for students to investigate, in depth, an area in nursing related to their program goals. The independent study may consist of directed study, reading, or research under the guidance of a member of the Graduate Faculty. Students desiring to enroll in this course must have a proposal outlining their activities approved by their advisor. The depth and breadth of these proposed activities should be commensurate with the number of credits awarded. Methods of supervision, of content, and evaluation of the independent activity will be determined by the student and the faculty advisor.
NU 700	Pharmacokinetics and Dynamics of Anesthesia Agents	This course will focus on drugs commonly employed to produce either sedation, general, or regional anesthesia. Ancillary medications administered during the perioperative period such as sedatives, opioids, neuromuscular blocking agents, anticholinesterases, anticholinergics, and drugs to reverse these effects will also be explored in-depth.
NU 701	Scientific Underpinnings for Nursing Practice	Explores the evolution and development of theories relevant to nursing practice, grand and middle-range theories, and their philosophical underpinnings and implications. This course has a minimum practicum component of 40 hours.
NU 702	Practice Inquiry: Designs, Methods and Analyses	Examines advanced research designs, methods and analysis common to clinical research focused on solving clinical problems and improving health outcomes. The course will prepare students to design, implement interpret and translate research into clinical practice. Methodologies to be studied include quantitative, qualitative and mixed methods. The course will focus on the formulation of researchable questions and hypotheses, various research designs, types of research variables and measurement. This course has a minimum practicum component of 40 hours.
NU 703	Theoretical Foundations for Organizational Change in Healthcare Systems	Provides a comprehensive exploration of organizational change theories and systems thinking approaches within an ethical context. The goal of this course is to develop and refine the leadership/management change skills of students to transform practice and educational environments in order to enhance the quality of nursing and healthcare delivery systems. This course has a minimum practicum component of 40 hours.
NU 704	Philosophy, Foundations, and Methods for Evidence-Based Practice	Introduces the concepts associated with evidence-based nursing practice models. The steps in implementing evidence-based practice are explored in depth. Issues related to information management technology will be introduced. Strategies for creating a culture of evidence-based practice both for individual and systems will be identified and barriers to evidence-based practice will also be identified. This course has a minimum practicum component of 40 hours.
NU 705	Advanced Topics in Health Informatics	Examines advanced topics in health informatics including revolutionizing health care through information and computer technology. This course has a minimum practicum component of 40 hours.
NU 706	Healthcare Quality and Patient Safety	Focuses on quality and patient safety initiatives. Strategies for creating a culture of quality and patient safety will be examined. The goal of the course is to provide the student with the scientific knowledge base and practical tools necessary for leadership in healthcare quality and patient safety initiatives so that an organizational quality infrastructure can be built. This course has a minimum practicum component of 40 hours.

NU 707	Leadership and Inter-Professional Collaboration	Focuses on the knowledge and skills necessary to provide exemplary leadership of groups and interprofessional teams with an emphasis on relationship building and team building. The goal of this course is to further enhance the student's leadership skill development in order to resolve complex clinical situations, improve practice environments, and lead integrated healthcare delivery teams. This course has a minimum practicum component of 40 hours.
NU 708	Clinical Prevention and Population Health for Improving the Nation's Health	Examines concepts related to health care outcomes identification, health promotion, disease prevention, disease management, and the design of innovative health care delivery models for vulnerable, underserved, and minority populations. This course has a minimum practicum component of 40 hours.
NU 709	Current Issues in Health and Social Policy: Planning, Participating and Policy Making	Focuses on understanding how health care is organized, financed, and delivered in the U.S. and examines key issues currently on the U.S. national policy agenda. Students will conduct health policy analysis, examine stakeholders' perspectives and environmental factors, and develop feasible policy options and recommendations. This course has a minimum practicum component of 40 hours.
NU 710	Practicum I	This is the first of three practicum courses to provide students the opportunity for application of knowledge gained in all core courses over the final three semesters of doctoral study. The Practice Inquiry Project begins in this course. This course has a minimum practicum component of 60 hours.
NU 711	Practicum II	This is the second of three practicum courses to provide students the opportunity for application of knowledge gained in all core courses over the final three semesters of doctoral study. The DNP Scholarly Project continues in this course. This course has a minimum practicum component of 60 hours.
NU 712	Practicum III	This is the third of three practicum courses to provide students the opportunity for application of knowledge gained in all core courses over the final three semesters of doctoral study. The Practice Inquiry Project concludes in this course. This course has a minimum practicum component of 60 hours.
NU 724	Chemistry and Physics Related to Anesthesia	This course builds on students' prior knowledge of the fundamental principles of chemistry and physics. The course develops an understanding of that chemistry, biochemistry and physics knowledge as it relates to the theory and practice of nurse anesthesia.
NU 748	Basic Principles of Anesthesia	This course is divided into three sections that introduce students to the basic principles underlying the specialty of anesthesia. The first section focuses on preoperative assessment of the patient and includes topics on the preoperative evaluation, the anesthetic implications of the presence of co-morbid diseases, anesthesia risk, psychological preparation and the use of preoperative medication. The second section focuses on the anesthesia machine, the anesthesia checklist, medical gas systems, electrical safety, and ancillary anesthesia equipment, monitoring modalities, breathing systems, carbon dioxide, and fluid management. The third section focuses on patient positioning, patient safety issues, temperature and humidity regulation, and infection control.
NU 750	Orientation to Clinical Practice	This course orients students to the clinical practice of nurse anesthesia. Students will integrate didactic content from the classroom setting for an understanding of the basic anesthetic clinical setup and pre-operative examination. Student participation, skills labs, and a culmination of a simulation immersion experience will introduce students to the preparation of the anesthesia setting in the operating room (OR)/anesthetizing site, pre-operative patient assessment, equipment, and medication checks all used in the practice of anesthesia.

NU 751	Clinical Practice I	In this course students begin to receive graduated, guided instruction in the clinical management of relatively young healthy ASA class I & II patients undergoing uncomplicated surgery who are receiving various types of general, regional, or monitored anesthesia care. Instruction is focused on the preparation and planning of the anesthetic, including administering the anesthesia under continual supervision and direction. Emphasis is placed on the technical instruction and experience, and correlation of the Basic Principles of Anesthesia course content. Students receive formative and summative evaluations, which are rated on a 6-point progression scale.
NU 752	Clinical Practice II	In this course students continue to receive 1:1 clinical instruction, focusing on ASA I & II patients undergoing uncomplicated surgery who are receiving various types of general anesthesia or regional anesthesia. Clinical instructors expect students to be more self-directed, developing comprehensive anesthesia care plans. Students receive formative and summative evaluations, which are rated on a 6-point progression scale.
NU 753	Clinical Practice III	In this course students continue to receive individual in-depth instruction in advanced clinical nurse anesthesia practice. Rotations in specialty anesthesia areas such as neuroscience, cardiovascular, thoracic, obstetrics, and pediatrics begin this semester. Students are taught to handle challenging patients who are at high risk for surgery and anesthesia. Emphasis is on critical, complex anesthesia management with advanced monitoring techniques, use of various pharmacologic agents, and managing high-stress scenarios. Students are expected to articulate a verbal anesthesia care plan with their clinical preceptor. Clinical instructors expect students to be self-directed, developing comprehensive anesthesia care plans. Students receive formative and summative evaluations, which are rated on a 6-point progression scale.
NU 754	Clinical Practice IV	In this course students continue to receive individual in-depth instruction in advanced clinical nurse anesthesia practice in specialty areas as neuroscience, cardiovascular, obstetrics, thoracic, regional, and pediatric anesthesia. Students develop and utilize practical clinical applications of nurse anesthesia theory. Students are individually assigned to specialty areas and will be formally evaluated at the end of each specialty. Clinical instructors expect students to be more self-directed and able to develop increasingly comprehensive anesthesia care plans. Students will receive formative and summative evaluations, which are rated on a 6-point progression scale.
NU 755	Clinical Practice V	In this course students continue to receive individual in-depth instruction in advanced clinical nurse anesthesia practice. Rotations in specialty anesthesia areas such as neuroscience, cardiovascular, thoracic, obstetrics, and pediatrics continue this semester. Students are taught to handle challenging patients who are at high risk for surgery and anesthesia. Emphasis is on critical, complex anesthesia management with advanced monitoring techniques, use of various pharmacologic agents, and managing high-stress scenarios. Students are expected to articulate a verbal anesthesia care plan with their clinical preceptor. Clinical instructors expect students to be self-directed, developing comprehensive anesthesia care plans. Students receive formative and summative evaluations, which are rated on a 6-point progression scale.
NU 756	Clinical Practice VI	In this course students continue to receive individual in-depth instruction in advanced clinical nurse anesthesia practice. Rotations in specialty anesthesia areas such as neuroscience, cardiovascular, thoracic, obstetrics, and pediatrics continue this semester. Students are expected to care for challenging patients who are at high risk for surgery and anesthesia. Emphasis is on critical, complex anesthesia management with advanced monitoring techniques, use of various pharmacologic agents, and managing high-stress scenarios. Students are expected to articulate a verbal anesthesia care plan with their clinical preceptor. Clinical instructors expect students to be self-directed, developing comprehensive anesthesia care plans that include the practical application of nurse anesthesia theory. Students receive formative and summative evaluations, which are rated on a 6-point progression scale.

NU 757	Clinical Practice VII	In this course students continue to receive individual in-depth instruction in advanced clinical nurse anesthesia practice in specialty areas as Neuroscience, Cardiovascular, Obstetrics, Thoracic, Regional and Pediatric anesthesia. Students develop and utilize practical clinical applications of nurse anesthesia theory. Students are individually assigned to specialty areas and are formally evaluated at the end of each specialty rotation. Clinical instructors expect students to be self-directed and able to develop comprehensive anesthesia care plans. Students will receive formative and summative evaluations, which are rated on a 6-point progression scale.
NU 758	Advanced Principles of Anesthesia I	This course was designed to build upon concepts presented in NU748 Basic Principles of Anesthesia. Advanced principles of anesthesia are introduced and integrated into anesthetic case-based learning. Students develop intellectual and clinical competence in the management of patients and special populations with increased complexity. Students are prepared to care for patients undergoing bariatric, laparoscopic, robotic, neuraxial, extra-thoracic, extracranial, intracranial, burns, neck, neuroskeletal, orthopedic, perineal, pelvic, vascular, hepatobiliary, pancreatic, and neuromonitoring procedures.
NU 768	Advanced Principles of Anesthesia II	This 3-credit course is designed to prepare students for the administration of monitored anesthesia care (MAC), local, regional and general anesthesia for patients, including special populations, undergoing a wide variety of diagnostic and surgical procedures. The course will prepare students to care for patients with various co-morbid diseases while incorporating anatomy, physiology, pathophysiology, pharmacology.
NU 775	Pathologic Aspects of Disease II	This course builds on previous knowledge gained concerning pathophysiological disease concepts presented in prerequisite coursework. This course provides students with a detailed description and breakdown of cardiac and pulmonary anatomy, physiology and function. Other systems presented in this course include the musculoskeletal, pulmonary, hepatobiliary, endocrine, renal, hematologic, gastrointestinal, immune, and central nervous system along with other systemic pathologies including cancer, immune/infectious diseases, and substance misuse. This course will also focus on the ways in which pathologic changes affect the anesthetic management of patients scheduled for a wide variety of diagnostic and/or surgical procedures who present with these co-morbid diseases.
NU 800	Philosophy of Science in Nursing	This introductory course focuses on the logic of inquiry in the natural and social sciences. Concepts for discussion include cause, determination, measurement, error, prediction, reduction, and the roles of theory and experiment. In addition to these central issues of scientific inquiry, the broader questions of values in science is discussed. In addition, the distinction between natural and social science—laws, theories, methodologies, confirmation, and acceptance—is explored. The course concludes with introductory discussions on how nursing as an applied science discipline connects to these intellectual developments.
NU 801	Theoretical Approaches to Research	This course explores the evolution and development of theories relevant to research, including grand and middle-range theories and their philosophical underpinnings and implications. The application of theory to research will be emphasized.
NU 802	Foundations of Scientific Writing	This course will develop competencies in scholarly communication through applying the micro and macrostructure of storytelling to scientific writing in health sciences research.
NU 810	Quantitative Research Methods	This quantitative methods course focuses on understanding and applying selected approaches to quantitative research. Practical approaches to applying quantitative methods to address health/healthcare problems will be examined including research design, sampling, measurement, data collection, data analysis, and human subject protection. Emphasis is placed on scientific principles and techniques used to minimize bias and maximize internal and external validity in quantitative inquiry.

NU 811	Team Science in Biomedical Research	This course provides students with basic knowledge to engage in team-based biomedical and clinical research. Students will learn how team science is critical to developing future biomedical research since complex problems will require solutions from teams of specialists from diverse backgrounds who are skilled at crossing the boundaries of disciplinary silos. Students will join an existing research team and access the NIH modules on Team Science to learn how to access relevant information on complex problems as well as learn how to form, lead, participate in, and evaluate research teams. The course will cover key concepts of team science and enable students to learn about the critical components of effective teams.
NU 812	Database Management and Design	This course lays the groundwork for database design, data collection and data management. The approach focuses on identification, formalization, and verification of study data, and is appropriate for both straightforward and complex clinical research studies. Students will learn how to request information and organize it into well-defined data collection instruments. Students completing this course will develop a fundamental facility for data collection, data organization, and data analysis for research projects, including data cleaning, coding, determining shape of distribution and outliers, and handling missing data. Students will learn to use SPSS for database design and data analysis, and to use electronic data collection platforms. Students will derive their familiarity with each application through a series of research project simulations.
NU 820	Determinant Models of Health	In this course, students will examine the intersectionality of social and biological determinants of health and their combined influence on health and health outcomes. Selected biological characteristics will be explored, including genetics, family history, pathology, anthropometry, adiposity, physical fitness levels, age, ethnicity, and gender. Social and environmental conditions will also be examined, such as places of birth, residence, work, leisure, and worship, as they affect health, physical functioning, health risks, and quality of health outcomes. The concepts of health disparities and health equity will be addressed, which are central to examination of health outcomes from both biological and sociological perspectives.
NU 821	Ways of Thinking	Students will explore the processes associated with creativity, innovation and design thinking and selected theories and principles of each. An experiential component of the course will include critique of students' early-stage dissertation proposals by immersion in a creativity think tank.
NU 830	Research Residency	The focus of this course is to engage nursing PhD students in a team science experience within a multidisciplinary research team. Students will apply principles of research design and innovation to develop and implement a project that supports and/or extends the work of the research team.
NU 831	Dissertation Seminar	This course provides advanced study in the student's discipline-specific research interest leading to the completion of the dissertation proposal. The course will cover developing and identifying the key elements/ dimensions of the project and structuring that into a significance and background/literature review section clearly articulating the healthcare context. In addition, the course will help students develop a well-defined research question(s)/problem statement and specific aims for the proposed project. Students will also learn to identify the methodology or process plan that is in alignment with the research question(s)/problem statement. This will include the target population, recruitment approach, data collection, project implementation, analytic strategy, human subjects and/or other steps. Students will be expected to draw on all their coursework as they prepare a dissertation proposal.
NUTRITION AND DIETETIC PRACTICE		

RDN 511	Nutritional Biochemistry & Physiology	The application of biochemistry and physiology to nutrition in the human body will be covered in this course. Subjects such as digestion, absorption, nutrient transport, nutrient utilization, and excretion will be addressed. The effect of diet and nutrients on disease processes as well as the effect of disease and treatment on health status will be explored. Course content will include bioenergetics and the metabolism of macro- and micronutrients on biochemical and physiological levels.
RDN 531	Integrative Nutrition Across the Life Cycle	This course provides an overview of nutrition in each stage of the human life cycle including reproduction, development, growth, health, human performance, and aging. Normal, healthy nutrition and nutritionally-related conditions are examined in detail at each stage of the life cycle. The physiological, behavioral, and psychosocial changes that affect nutrition status within each stage as well as the nutritional needs, risks, and recommendations of each stage of the lifecycle will be examined in this course. This course reviews the nutrition-related public programs and health care system provisions by stage of life. Content will address how to apply cultural knowledge and scientific evidence to nutrition interventions and recommendations for any age group to promote physical, emotional, psychological, and spiritual wellness.
RDN 535	Food Science & Safety	This course will include the foundational information surrounding the science of food as well as an in-depth review of the programs ensuring the safety of food. Content will address the chemical and functional properties of food and nutrients as well as the current methods and technology used to develop, produce, and preserve foods. The microbiological, chemical, and toxicological aspects of food spoilage and food fermentation via microorganisms found in food will be covered. This course will also focus on current food safety programs used to control biological, chemical, and physical hazards to assure the safety of foods. The application of programs such as Current Good Manufacturing Practices (cGMP), Sanitation Standard Operating Procedures (SSOPs), Hazard Analysis Critical Control Point (HACCP), etc. in food safety management systems will be examined. Students will earn Safe Quality Foods, ServSafe, and HACCP certifications.
RDN 537	Culinary Nutrition, Functional Foods, & Diet Planning	This course will cover three major aspects of nutrition and dietetics: culinary nutrition, functional foods, and diet planning. The overlapping nature of these aspects will be apparent as students learn to prepare healthy food products that are appealing, nutritious, and functional. Course content will emphasize strategies to incorporate functional foods into nutrition care plans and menu plans as well as development of meal plans for individuals and for groups while utilizing nutrition care software. Pre- or Co-requisites: RDN 531 and RDN 535 or approved equivalents
RDN 571	Medical Nutrition Therapy 1	Medical Nutrition Therapy 1 is the first of two courses that delves into the use of nutrition and diet as a therapy to prevent, manage, and/or treat disease. This course applies the biochemical nature of nutrition therapy to various health conditions. Course content covers the Nutrition Care Process and application of nutritional assessment techniques and diet therapy strategies to case studies. Course activities provide opportunities to compose nutrition care plans in using different medical charting styles and will describe the interdisciplinary nature of medical nutrition therapy. *The Individual Life & Wellness History module of the JCIPE Health Mentors Program will be embedded within this course. Pre- or Co-requisites: RDN 511, RDN 531 and RDN 535 or approved equivalents
RDN 612	Nutrition Communication, Education, & Leadership	This course will cover the foundation, design, and delivery of nutrition communication. Course activities will provide opportunities to practice development of audience-focused communication. This course will provide a review of the communication methods used in all facets of the dietetics field, over a large variety of channels, including oral presentations, writing, video, food photography, and food demonstrations. This course will also include aspects of professional leadership within the field including characteristics, skills, and strategies. Prerequisites: RDN 531 or approved equivalent

RDN 614	Nutrition Counseling	<p>This course will provide students with the opportunity to apply counseling techniques, behavior change theories/models, and educational principles to nutrition counseling sessions. The course will focus on the motivational interviewing approach. Didactic and experiential learning will be combined in this course to enable students to learn, practice, reflect, and grow. Factors affecting food behaviors, cultural responsiveness, professional ethics, communication methods, barriers to learning, evidence-based information, and patient-centered counseling are among the concepts that will be covered in this course. *The Influence of the Environment on Personal Wellness module of the JCIPE Health Mentors Program will be embedded within this course.</p> <p>Prerequisites: RDN 531 (or approved equivalent) and RDN 571 Pre- or Co-requisite: RDN 612</p>
RDN 622	Global & Public Health Nutrition	<p>In this course, students will examine the ways health determinants, health disparities, and accessibility of resources influence the nutrition status of the public at local, national, and global levels. Learning activities provide experience with needs assessments, program planning and implementation, fundraising and stewardship, and program evaluation. The challenges that nutrition professionals face in the field of public health nutrition and strategies to overcome these challenges are covered.</p> <p>Prerequisite or Corequisite: RDN 531 or approved equivalent</p>
SCJU 631	Social Justice Seminar: Food, Weight, and Health	<p>This seminar is the second of a four-seminar series that focuses on social justice in the field of nutrition and dietetics. Course content will cover topics related to inequitable food access and dietary recommendations, weight bias, and health disparities. Learning activities will provide opportunities to explore how each of these topics impact the dietetics profession, and how dietitians can play a role in creating more equitable food and health systems.</p> <p>Prerequisite: Enrollment into the MS/RDN program and/or instructor approval</p>
SCJU 632	Social Justice Seminar: Interprofessional Perspectives	<p>This seminar is the first of a four-seminar series that focuses on social justice in the field of nutrition and dietetics. Course content will address social justice issues across a variety of health care professions. Learning activities will provide opportunities to explore how representatives of varied health disciplines advocate for equitable health care and social justice in their own field.</p> <p>Prerequisite: RDN 571 or approved equivalent</p>
SCJU 633	Social Justice Seminar: Systemic Barriers and Challenges	<p>This seminar is the third of a four-seminar series that focuses on social justice in the field of nutrition and dietetics. Course content will address social determinants of health and their influence specifically on nutritional wellbeing. Learning activities will provide opportunities to investigate systemic barriers and challenges that limit individuals' access to adequate nutrition services and agency over nutritional health.</p> <p>*The Influence of Society/Policy on Community & Personal Wellness module of the JCIPE Health Mentors Program will be embedded within this course.</p> <p>Prerequisites: RDN 622, SCJU 631, SCJU 632</p>
SCJU 634	Social Justice Seminar: Analysis and Advocacy	<p>This seminar is the fourth of a four-seminar series that focuses on social justice in the field of nutrition and dietetics. Learning activities will provide opportunities to analyze multiple factors impacting nutritionally-related social justice issues and determine solutions worthy of advocating. Course content will cover strategies involved in advocating for a nutritionally-related social justice effort.</p> <p>Prerequisites: SCJU 631, SCJU 632 Prerequisite or Corequisite: SCJU 633</p>
RDN 661	Management in Nutrition	<p>This course will provide students the opportunity to gain management and leadership skills used in organizational systems, programs, and projects throughout the field of nutrition and dietetics including the areas of food systems, clinical nutrition, public nutrition, and commercial nutrition practice. Course content will cover management theories and tools used to manage human resources, work/services, and finances in nutrition practice.</p> <p>Prerequisites: RDN 531, RDN 535, RDN 537 or approved equivalents</p>

RDN 665	Sustainable Nutrition Practice	<p>This course will cover three aspects of sustainability within the field of nutrition: social, professional, and environmental. The socially sustainable practices reviewed in this course will include diversity, inclusion, addressing systemic bias, ethics, and governance within the field. Learning activities will provide opportunities to explore practices that promote professional sustainability including advocacy, legislation, representation, as well as the development and/or promotion of profession-specific practices. Content will include avenues through which environmental health is impacted by sustainable practices within worksite/professional practices, food systems, and through food consumption.</p> <p>Prerequisites: RDN 531, RDN 535, RDN 537 or approved equivalents</p>
RDN 671	Medical Nutrition Therapy 2	<p>Medical Nutrition Therapy 2 is the second of two courses that delves into the use of nutrition and diet as a therapy to prevent, manage, and/or treat disease. This course applies the biochemical nature of nutrition therapy to various, increasingly complex and intersecting health conditions. Course content covers the Nutrition Care Process and application of nutritional assessment techniques and diet therapy strategies to case studies. Course activities provide opportunities to prioritize nutrition diagnoses and interventions as part of nutrition care plans using different medical charting styles.</p> <p>Prerequisites: RDN 571</p>
RDN 675L	Nutrition Support	<p>Enteral and parenteral nutrition support will be reviewed in this laboratory course. Composition, function, administration, and specialization of nutrition support will be covered in detail. Course activities will allow students to practice nutrition support calculations, orders, administration, and evaluation. This lab provides students the opportunity to gain experience working with nutrition formulas, tube feeding, and intravenous nutrition support.</p> <p>Prerequisites: RDN 571 Pre- or Co-requisite: RDN 671</p>
RDN 681	Nutrition Research	<p>Research methods, ethics, planning, implementation, analysis, and dissemination will be covered in this course. The scope of nutritional research, from in vitro and cellular studies to clinical and epidemiological studies, will be reviewed in this course. Learning activities will provide the opportunity to interpret and apply dietetics and nutrition research findings to professional practice.</p> <p>Prerequisites: RDN 571, RDN 614 Prerequisite or Corequisite: RDN 622 or approved equivalent</p>
RDN 692	Capstone Course	<p>This course will provide students the opportunity to reflect on and review all of the knowledge, skills, and experiences gained within the program. Learning activities will provide students with opportunities to demonstrate their achievement of varied professional competencies through activities, practicums, and their program portfolio.</p> <p>Pre- or Co-requisites: RDN 712, RDN 714, RDN 722, RDN 761, RDN 762, RDN 765, RDN 773</p>
RDN 712	SEL - Nutrition Communication, Education, & Leadership Experience	<p>This course will allow students the opportunity to apply concepts, theories, and skills addressed in the Nutrition Communication, Education, & Leadership lecture course. This supervised experiential learning course will provide students the opportunity to work with preceptors engaged in communicating nutrition messages to target audiences. Students will engage in communication, group education, and leadership professional activities in order to demonstrate effective and ethical communication skills in appropriate modes to achieve desired outcomes.</p> <p>Prerequisite or Corequisite: RDN 612</p>
RDN 714	SEL - Nutrition Counseling Experience	<p>This course will allow students the opportunity to apply concepts, theories, and skills addressed in the Nutrition Counseling lecture course. This supervised experiential learning course will provide students the opportunity to work with preceptors engaged in nutrition counseling. Students will lead nutrition counseling sessions under the guidance of preceptors.</p> <p>Prerequisites: RDN 614</p>

RDN 722	SEL - Public Nutrition Experience	<p>This course will allow students the opportunity to apply concepts, theories, and skills addressed in the Global & Public Health Nutrition lecture course. This supervised experiential learning course is designed to expose students to the infrastructure, development, and support of public nutrition services. Course learning activities will give students the opportunity to participate in the planning, implementation, and/or the evaluation of a public nutrition effort. Additionally, students will observe and engage in the application of community and/or population health theories in nutrition program planning processes.</p> <p>Prerequisites: RDN 531, RDN 535, RDN 537, and RDN 622 or approved equivalents</p>
RDN 761	SEL - Nutrition Management Experience	<p>This course will allow students the opportunity to apply concepts, theories, and skills addressed in the Management in Nutrition lecture course. This supervised experiential learning course is designed to provide students the opportunity to gain management experience in the field of nutrition. Course activities may take place in any of a variety of settings that involve the management of organizations, projects, and people.</p> <p>Pre- or Co-requisite: RDN 661</p>
RDN 762	SEL - Food Service and Culinary Experience	<p>This course will allow students the opportunity to apply concepts, theories, and skills addressed in the Management in Nutrition and Culinary Nutrition, Functional Foods, & Diet Planning lecture courses. This supervised experiential learning course will focus on the professional practices of food systems management and utilizing food to enhance nutritional health. Course activities will provide students with opportunities to apply their knowledge of chemistry, food safety, food service, food science, microbiology, psychology, and sociology as it relates to nutrition services. This experience will allow students to evaluate the behavioral, cognitive, cultural and environmental aspects of eating while engaging in culinary nutrition practice. Students will additionally have the opportunity to apply their food systems management and culinary skills to demonstrate their knowledge of safe food product/service planning, preparation, and evaluation.</p> <p>Prerequisites: RDN 535, RDN 537 or approved equivalents Prerequisite or Corequisite: RDN 661</p>
RDN 765	SEL - Sustainable Nutrition Experience	<p>This course will allow students the opportunity to apply concepts, theories, and skills addressed in the Sustainable Nutrition Practice lecture course. This supervised experiential learning course is designed to provide students the opportunity to gain experience integrating sustainable practices into nutrition and dietetics organizations and services.</p> <p>Prerequisite or Corequisite: RDN 665</p>
RDN 771	SEL - Introduction to Nutrition Therapy	<p>This course will allow students the opportunity to observe and examine how concepts, theories, and skills addressed in the Medical Nutrition Therapy lecture courses are applied by nutrition professionals in the field. This supervised experiential learning course is designed to provide students with an introduction to clinical nutrition settings, policies, and procedures. The purpose of this exposure is to orient students to clinical settings, allow them to observe and practice the nutrition care process in the in-patient setting, and better prepare them for further clinical learning experiences with preceptors.</p> <p>Prerequisite or Corequisite: RDN 671</p>
RDN 772	SEL - Clinical Experience 1	<p>This course will allow students the opportunity to apply concepts, theories, and skills addressed in the Medical Nutrition Therapy lecture courses. This supervised experiential learning course provides students the opportunity to become competent in clinical nutrition practice. Students will be supervised by RDN preceptors who provide nutrition care services and medical nutrition therapy to patients in their respective facilities. Students will conduct nutritional screenings and utilize the nutrition care process in a variety of clinical practice settings. Students will implement nutrition interventions for patients that will include medical nutrition therapy, nutrition education, nutrition counseling, and/or nutrition-related pharmacotherapy.</p> <p>Prerequisites: RDN 671, RDN 771</p>

RDN 773	SEL - Clinical Experience 2	<p>This course will allow students the opportunity to apply concepts, theories, and skills addressed in the Medical Nutrition Therapy lecture courses at the competence of an entry-level practitioner. This supervised experiential learning course provides students the opportunity to become competent in increasingly complex clinical nutrition practice. Students will be supervised by RDN preceptors who provide nutrition care services and medical nutrition therapy to patients in their respective facilities. Students will conduct nutritional screenings and utilize the nutrition care process in a variety of clinical practice settings. Students will implement nutrition interventions for patients that will include medical nutrition therapy, nutrition education, nutrition counseling, and/or nutrition-related pharmacotherapy.</p> <p>Prerequisites: RDN 671, RDN 772</p>
RDN 782	SEL - Individualized Professional Experience	<p>This supervised experiential learning course provides students with the opportunity for desired or needed additional experience in selected areas of practice in the field of nutrition and dietetics. Student performance and progression toward competency will determine the course site assignment and schedule. The student's professional goals will additionally be taken into consideration when determining SEL activities.</p> <p>Prerequisite or Corequisite: RDN 612, RDN 614, RDN 622 (or approved equivalent), and RDN 671</p>
OCCUPATIONAL THERAPY (EAST FALLS)		
OCC 610	Evolving Professional Seminar	<p>This course guides students in their development as occupational therapists. Concepts related to professionalism, reflection and ethical practice, and collaboration are explored. Students are introduced to the program's leadership content and self-assessment as tools to facilitate the professional socialization process.</p>
OCC 611	Foundations for Practice	<p>This course provides an overview of occupational therapy theory and domains of practice, including practice roles and functions, regulatory and legislative mandates and constraints, and historical and philosophical foundations</p>
OCC 613	Functional Anatomy	<p>Students gain knowledge of structure and function of the human body and lays the foundation for an understanding of biomechanical and kinesiology concepts as they relate to human movement. Anatomy and movement will be discussed through stages of typical development as well as in common pathologies occurring through the lifespan.</p>
OCC 616	Assistive Technologies and Design	<p>Students develop collaborative partnerships with clients and professionals in the evaluation, design and application of assistive technologies to facilitate occupational performance. Course activities include applying the principles of task analysis and universal design, critically analyzing evaluation data, and representing the client's perspective. The culminating course project assists students to examine their evolving understanding of occupation, adaptation, and participation.</p> <p>Prerequisite: OCC 621</p>
OCC 621	Occupational Competence	<p>The psychological, social, cultural, biological and developmental dimensions of occupational performance across the lifespan are explored. Students learn to operationalize the profession's practice framework by practicing activity analysis in the context of occupational performance. Impact of physical, social and cultural environments on occupational choice is explored.</p>
OCC 623	Applied Neuroanatomy	<p>This course provides in-depth exploration of the neuroanatomical, neurochemical, neurophysiological, cognitive, motor and sensorimotor basis of brain function as it relates to human performance including identification of major structures and functions of normal and abnormal nervous systems. Students develop an understanding of the neurobiological substrates of behavior and learning. Particular emphasis is placed on the relationship of neuroanatomy to human movement, problem solving and executive functions.</p> <p>Prerequisite: OCC 613</p>

OCC 625	Clinical Skills A	Students begin the development of clinical competencies for safe clinical practice. Topics such as critical values, mobility devices, body mechanics and basic transfer techniques, as well as documentation for skilled service are explored. Skills are practiced in hands-on laboratory environments and then applied through Level I Fieldwork.
OCC 626	Evidence Based Practice	Students become skillful consumers of research literature for the purposes of evidence-building and develop skills allowing them to assess occupational therapy outcomes. Students are introduced to the research perspective and evidence-based practice as a basis for professional competence. Course experiences include examining research designs, research ethics, and developing and answering clinical practice questions. Prerequisite: OCC 611
OCC 628	Introduction to Evaluation	Students learn to select, critique and project evaluation of clinical utility. Course content also addresses how evaluation leads to occupational therapy intervention and outcomes measurement. Prerequisite: OCC 611
OCC 635	Clinical Skills B	This course includes development of competencies in safe clinical practices. Topics such as advanced transfer skills, wheelchair/cushion fitting, and amputation care are explored. Skills are practiced in hands-on laboratory environments and then applied through Level I Fieldwork. Prerequisite: OCC 625
OCC 645	Clinical Skills C	This course includes development of competencies in safe clinical practices for physical agent modalities (PAMs), fabrication and application of splinting devices, and wound care. Skills are practiced in hands-on laboratory environments and then applied through Level I Fieldwork. Prerequisite: OCC 613
OCC 735	Level I Fieldwork A	The overall purpose of the fieldwork experience is to provide students with exposure to clinical practice through directed observation and active participation in selected aspects of the occupational therapy process. The opportunity to work with clients and therapists helps students to examine their reactions to clients, themselves and other personnel while integrating academic learning with clinical practice. The focus of the fieldwork experience will be the application of knowledge and skills related to the psychological and social factors that influence engagement in occupation. Prerequisite: OCC 611 and OCC 621
OCC 741	Interpersonal Relations and Groups	Interpersonal skills and communication are critical for building effective professional relationships. Students explore the dynamics of collaboration including their own communication styles and how to enhance therapeutic use of self as an intervention tool. Designing occupation-based groups for therapeutic intervention will be explored, as will dynamics of implementing group strategies for education and/or advocacy. Prerequisite: OCC 611 and OCC 621
OCC 745	Level I Fieldwork B	The overall purpose of the fieldwork experience is to provide students with exposure to clinical practice through directed observation and active participation in selected aspects of the occupational therapy process. The opportunity to work with clients and therapists helps students to examine their reactions to clients, themselves and other personnel while integrating academic learning with clinical practice. The focus of the fieldwork experience will be the application of knowledge and skills related to clinical practice in adult physical disabilities. Prerequisite: OCC 621 and OCC 623 and OCC 625 and OCC 635

OCC 746	Psychosocial Interventions	<p>This course examines occupational therapy assessment and intervention approaches as they apply to patients/clients whose health has been impacted by psychological, cognitive, social, cultural, and/or spiritual factors due to mental health conditions, trauma, or environment. Students apply theory and knowledge of occupational engagement to assess and develop occupational based interventions for clients. Course content incorporates DSM V, trauma, case management, client/caregiver training, documentation strategies, and individual assessment and intervention planning.</p> <p>Prerequisite: OCC 621 and OCC 623</p>
OCC 748	Assessment & Intervention: Adults	<p>This course examines occupational therapy assessment and intervention approaches for adults experiencing physiological, musculoskeletal, or neurological impairments, or other medical conditions that impact function, health and participation. Learning activities, designed to promote clinical reasoning and collaborative team skills, help students to develop a repertoire of strategies to assess and analyze the adult's occupational performance in context, establish goals appropriate to the individual and practice setting, and design intervention plans based on a variety of theoretical perspectives.</p> <p>Prerequisite: OCC 621 and OCC 623 and OCC 625</p>
OCC 749	Children and Youth A	<p>This course examines occupational therapy assessment and intervention approaches for children and youth whose lives have been affected by cognitive, sensory processing and psychosocial conditions. Major theories of typical and atypical childhood development are explored through an occupational therapy perspective. Learning activities, designed to promote clinical reasoning and collaborative team skills, help students to develop a repertoire of strategies to assess and analyze the child's occupational performance in context, establish goals appropriate to the individual and practice setting, and design intervention plans based on a variety of theoretical perspectives.</p> <p>Prerequisite: OCC 613 and OCC 621 and OCC 623</p>
OCC 751	Professional Issues and Trends	<p>This course examines major issues and trends affecting occupational therapy service delivery in today's practice environment. Through course discussion and activities students demonstrate an understanding of management functions, supervision and role delineation, regulations, reimbursement, advocacy, and ethics.</p> <p>Prerequisite: OCC 746 and OCC748 and OCC 749 and OCC 759</p>
OCC 754	Environmental Dimensions of Occupation	<p>This course provides an in-depth exploration of the physical, cognitive, psychological and social dimensions of the environment. The impact of the environment on behavior and the individual's ability to mount an adaptive response will be examined. Students will demonstrate an understanding of the historical and theoretical basis for physical and social adaptations.</p> <p>Prerequisite: OCC 616 and OCC 621</p>
OCC 756	Level I Fieldwork C	<p>The overall purpose of the fieldwork experience is to provide students with exposure to clinical practice through directed observation and active participation in selected aspects of the occupational therapy process. The opportunity to work with clients and therapists helps students to examine their reactions to clients, themselves and other personnel while integrating academic learning with clinical practice. The focus of the fieldwork experience will be the application of knowledge and skills related to clinical practice with children and youth.</p> <p>Prerequisite: OCC 621 and OCC 623 and OCC 625 and OCC 635</p>
OCC 757	Innovative Practice in Occupational Therapy	<p>This course provides an overview of emerging practice areas in occupational therapy. Students engage in program development to meet the changing political, social and health needs of society. The interrelationships of person, environment and occupation within communities and populations is examined. Students collaborate with stakeholders including local agency staff and consumers to identify and develop potential client-centered and evidence-based programs.</p> <p>Prerequisite: 2 courses; from courses OCC 746; OCC 748; OCC 749</p>

OCC 759	Children and Youth B	<p>This course examines occupational therapy assessment and intervention approaches for children and youth whose lives have been affected by sensorimotor, neuromotor and biomechanical conditions. Major theories of typical and atypical childhood development are explored through an occupational therapy perspective. Learning activities, designed to promote clinical reasoning and collaborative team skills, help students to develop a repertoire of strategies to assess and analyze the child's occupational performance in context, establish goals appropriate to the individual and practice setting, and design intervention plans based on a variety of theoretical perspectives.</p> <p>Prerequisite: OCC 613 and OCC 621 and OCC 623 and OCC 749</p>
OCC 764	Specialty Practice: Upper Extremity Rehab	<p>Students learn the clinical reasoning process that guides occupational therapy upper extremity rehabilitation with a focus on assessment, goal setting, treatment planning and documentation strategies. The practical, philosophical and theoretical bases for intervention are reviewed for the following advanced practice techniques: physical agent modalities (PAMs), kinesiotaping, joint mobilization, static and dynamic splinting, post-surgical techniques, and upper quadrant interventions. The need for advanced certification as well as parameters for referral to and/or collaboration with other disciplines will be explored.</p> <p>Prerequisite: OCC 645 and OCC 748</p>
OCC 766	Older Adults: Enabling Participation	<p>This course provides an in-depth analysis of the impact of aging on health, well-being, and participation in older adults. Impact of normal aging, changing health status, role transition, memory and life review, retirement/leisure pursuits, wellness, and end of life issues are explored. Consultative models and practice domain challenges/opportunities are reviewed.</p> <p>Prerequisite: OCC 611 and OCC 621 and OCC 623</p>
OCC 767	Critical Inquiry I	<p>In this course series students will participate in a supervised research experience to deepen critical inquiry skills. As future evidence-based practitioners, this will support the student's ability to meaningfully integrate empirical evidence into practice. This course is the first of two; the second course culminates in a presentation for a selected audience.</p> <p>Prerequisite: OCC 626</p>
OCC 769	Critical Inquiry II	<p>This is the second of two courses designed to deepen students' research skills. Students will analyze and synthesize the results of their respective research projects. This course culminates in a presentation for a selected audience.</p> <p>Prerequisite: OCC 626 and OCC 767</p>
OCC 778	Level II Fieldwork A	<p>The fieldwork component of the curriculum provides students with an in-depth experience in delivering occupational therapy services to clients in practice settings. Students integrate knowledge and skills gained through classroom, experiential, and self-directed learning experiences with applied clinical reasoning assignments to achieve entry-level practice competence by the end of the fieldwork experience. Students complete two, full time, 12- week fieldwork placements following didactic coursework. Successful completion of the fieldwork education component is a requirement for graduation from the Occupational Therapy Program.</p>
OCC 779	Level II Fieldwork B	<p>The fieldwork component of the curriculum provides students with an in-depth experience in delivering occupational therapy services to clients in practice settings. Students integrate knowledge and skills gained through classroom, experiential, and self-directed learning experiences with applied clinical reasoning assignments to achieve entry-level practice competence by the end of the fieldwork experience. Students complete two, full time, 12- week fieldwork placements following didactic coursework. Successful completion of the fieldwork education component is a requirement for graduation from the Occupational Therapy Program.</p>

OCC 784	Mastery	<p>This course requires the integration of previously acquired knowledge and clinical skills. Through case discussion and self-testing and reflection, students review the domain and process of occupational therapy practice, incorporating clinical reasoning to inform decisions across the practice continuum.</p> <p>Prerequisite: OCC 746 and OCC 748 and OCC 749 and OCC 759 and OCC 766</p>
OCCUPATIONAL THERAPY (Center City)		
OT 552	Interventions: Enhancing Human Performance	<p>This course focuses on the knowledge development in the occupational therapy processes of clinical reasoning, intervention planning and intervention implementation as applied to occupational performance problems of children and adults resulting from a variety of client factors. Traditional and contemporary intervention strategies to maximize engagement in areas of occupation and to enhance performance skills and performance patterns are presented. Emphasis is placed on the application of therapeutic use of self, occupation-based activities, purposeful activities, preparatory methods and educational processes. Students examine how to identify the need for OT services and how to interpret assessment findings as the basis for client centered and contextually relevant intervention plans. Additional critical elements of the intervention process, including safety, outcome selection, intervention review and reassessment, service termination and discharge planning are woven into the course. Students will participate in weekly labs that provide opportunities to practice and apply intervention techniques and strategies introduced in weekly lectures to promote engagement in areas of occupation (ADL, IADL, Work, Education, Play, Leisure, and Social Participation) and enhance performance skills and performance patterns.</p> <p>Prerequisites: OT 302 and OT 308 or OT780 and OT 311 and OT 357</p>
OT 558	Interventions: Enhancing Social Participation	<p>This intervention-based course encourages students to examine and build knowledge and skills in the delivery of psychosocial, preventative, and health and wellness interventions used in occupational therapy practice. Students develop and analyze personal and professional behavior skills while engaging in didactic and small group activities to develop and apply their clinical reasoning. Students also explore the theoretical premise and practice application of individual, group, and consultation psychosocial interventions used by occupational therapists in traditional, community based, and emerging practice settings within the constructs of the Occupational Therapy Practice Framework (OTPF 3). In laboratory sessions, students participate and reflect upon the development, implementation, and effectiveness of meaningful, activity-based groups to address specific populations. Students collaborate, design, and implement evidence and occupation-based activity sessions that are developmentally sensitive to social participation needs occurring in groups while adhering to a theoretical base.</p> <p>Concurrent with OT 441.</p>
OT 560	Environmental Competence	<p>This course offers students an opportunity to understand the relationship between social, cultural and political forces in society and the profession of occupational therapy. Over the semester students will carefully examine how these external pressures have influenced the evolution of the field of occupational therapy with particular attention given to core and related concepts of occupation, competence, environment and adaptation. Concurrently, students trace the development of occupational therapy paradigms, models and theories as evidenced in the occupational therapy literature using methods associated with theoretical analysis. The concepts and constructs that form the basis of present practice models and theories will be identified, as well as those that may emerge and influence the future directions of the field. Students will compare the values, knowledge and skills reflected in these ideas and critique evidence of practice based and research based application. They will also have an opportunity to propose conceptual changes to existing theories and models.</p>

OT 561	Environmental Competence Lab	<p>In this laboratory course students examine, analyze, plan, fabricate, and simulate environments in which humans participate in occupations. Students will analyze, design and fabricate environmental adaptations/interventions to enable participation in occupations. Lab sessions provide opportunities for observation, demonstration, active problem solving and practice of specific skills used in environmental adaptation. These skills include assessment, intervention techniques, safety planning, identification of assistive technology and other resources to enhance participation in daily occupations. Students participate in problem-solving activities to provide opportunity for application of client-centered environmental adaptations in a variety of settings (client homes and community centers via OT 562 course, various environmental locations on campus and in the surrounding community).</p> <p>Corequisite: OT 560 and 562 Prerequisites: OT 311 and OT 336</p>
OT 562	Environmental Comp in Action	<p>Students work directly and collaboratively with an individual client in the community to apply concepts from OT 560 Environmental Competence. Students design, fabricate and implement environmental adaptations, and develop strategies to successfully incorporate these adaptations into the individual's daily routines. Students develop their clinical reasoning, problem solving abilities, and (oral & written) communication skills as they are guided through this process by regular meetings with a faculty preceptor.</p> <p>Corequisite: OT 560 and 561 Prerequisites: OT311 and OT 336</p>
OT 577	Historical Perspectives on Theory-Based Practice	<p>This course offers students an opportunity to understand the relationship between social, cultural and political forces in society and the profession of occupational therapy. Over the semester students will carefully examine how these external pressures have influenced the evolution of the field of occupational therapy with particular attention given to core and related concepts of occupation, competence, environment and adaptation. Concurrently, students trace the development of occupational therapy paradigms, models and theories as evidenced in the occupational therapy literature using methods associated with theoretical analysis. The concepts and constructs that form the basis of present practice models and theories will be identified, as well as those that may emerge and influence the future directions of the field. Students will compare the values, knowledge and skills reflected in these ideas and critique evidence of practice based and research based application. They will also have an opportunity to propose conceptual changes to existing theories and models.</p>
OT 578	Evidence-Based Practice I	<p>Students will demonstrate their ability to initiate theory-based practice with specialized patient problems by selecting appropriate assessment instruments, establishing meaningful treatment goals and planning appropriate intervention that promotes functional performance in self-care, work, and leisure pursuits.</p>
OT 579	Evidence Based Practice II	<p>Students continue to analyze their clinical practice during their second Level II Fieldwork experience through reflection, clinical reasoning, and the application of the best available evidence to solve clinical problems. This on-line asynchronous course, taken simultaneously with OT 482, offers students guidance and opportunity to transfer developing EBP skills and behaviors in a new practice environment. In addition to other web-based learning activities, students generate clinical/practice questions derived from their current practice arena and conduct in-depth literature reviews, critical analysis, and synthesis of the best available evidence to facilitate and promote EBP in the workplace.</p>

OT 600	Occupational Therapy Professional Seminar	This seminar course introduces students to the wide scope of the profession's domain of concern; specifically participation in daily meaningful occupations, occupational justice; primary care practice; and professional power. Through discussion, readings, and other learning activities, students begin their enculturation to the profession and developing an identity as members of the profession. Students are introduced to an evidence-based, systematic method of problem solving and use of critical thinking and analysis skills in proposing solutions to issues facing the profession in the healthcare environment today.
OT 603	Research Methods and Mentorship	This course will address the interrelationships between theory, research and practice. Emphasis will be placed on the acquisition of methods for extending the scientific base of knowledge for advanced occupational therapy practice and for incorporating the use of evidence based practice into practice. Qualitative, quantitative, and mixed method research designs and related analytic techniques for appraising research evidence will be examined in terms of their appropriateness for advancing knowledge of occupation and for addressing various research problems in occupational therapy. Learning methods include class activities, readings, critique of published studies, literature search and data analysis.
OT 627	Program Design/Evaluation	The role of the healthcare provider as a program developer, evaluator and consultant is covered in this course. Students develop introductory knowledge and skill in the processes and techniques of program design and evaluation needed to add to services traditionally provided in a setting or to plan new programs.
OT 631	Focus on the Child in Early Intervention and School Based Practice	The occupational therapy process with infants, toddlers and the school-aged child within the context of his or her natural environment is examined. Students learn to use a family centered, interdisciplinary approach to early intervention and school-based practice. A variety of assessment and intervention strategies for the young and school-aged child are included. Students integrate and apply current literature related to the occupational therapy process, natural environments, legislation, school system policy and organization, the use of sensory integration and family-centered care.
OT 670	Advanced Research Seminar	This seminar provides an opportunity for learners to apply research skills to answer clinical questions that affect the provision of occupational therapy services. With a small group of peers, learners develop a scholarly presentation to enhance the professional development of clinicians. Learners obtain an advanced understanding of important methodological considerations needed to design and complete projects for professional audiences. Prerequisites: OT 578 and 579 and 603
OT 680	Leading Edge Occupational Therapy Practice	This course provides a comprehensive exploration of current issues in research and evidence based practice in occupational therapy. The course begins with the student's exploration of professional development in the area of research and scholarship, then proceeds to review philosophic traditions, research design and methodology, and strategies for data analysis that will provide a solid framework for understanding the appraisal and implementation process in advanced evidence based practice. The remainder of the course builds upon this framework and provides a structure from which to build knowledge and skills in survey development, program evaluation, and development of objectives and outcomes for the final doctoral project. Offered according to projected BS-OTD enrollment per semester.

OT 681	Advanced Practicum in Occupational Therapy	A total of 6 credits are awarded for documented clinical practice experience since graduation. Credit is contingent on completion of appropriate clinical practice forms (See AOTA Professional Development Plan from the AOTA website) and requires that students register for the Advanced Occupational Therapy Practicum course. Students also must be members of AOTA. Students create a professional review that is as much a process as it is a product. It serves not only as a record of past work history, professional accomplishments, and professional and leadership activities but also as documentation of the activities identified to meet current and future professional development needs. Offered all semesters.
OT 682	Clinical Leadership	Utilizes conceptual frameworks for guiding development as leaders in occupational therapy practice, research, education, advocacy, and administration. Explores and expands the knowledge and skills necessary for occupational therapists to assume leadership roles in a wide range of practice and research arenas.
OT 700	Developing Your OTD Practice Toolkit	This course is designed to facilitate doctoral students' introduction into and continued progression through Jefferson's OTD program. The OTD student will develop the critical skills necessary to navigating traditional, emerging health care and community based settings. An introduction to the professional socialization process associated with the clinical doctorate in occupational therapy will be introduced. The doctoral student will develop essential skills relating research to the practical needs of individuals, groups and populations. A variety of tools will be revealed to cultivate the professional skills necessary to navigating complex systems. Students will acquire skills for preparation regarding the diverse roles that are expected from a doctorate level professional by completing a preliminary OTD trajectory. Learning is facilitated through by on campus sessions and online readings, doctoral faculty presentations and discussion, reflection and active learning activities.
OT 701	Exploration of Doctoral Level OT: The Faculty Mentored Experience	Students will be introduced to occupational therapy faculty, projects, research activities and the doctoral capstone manual in order to understand and identify clinical practice, research activities and opportunities available during the capstone experience and project. In order to cultivate the necessary skills required for the doctoral capstone experience and project, OTD students explore areas of clinical practice, leadership and collaborative research by learning about the faculty-driven research and scholarship activities. Traditional and contemporary practice models emphasizing the promotion of health and wellness, individual, population and systems-based intervention(s) and evidence-based practice will be introduced.
OT 702	OTD Leadership: National and Global Perspectives	Doctoral students will evaluate and apply leadership approaches in order to begin to develop their own leadership skills and style for effective navigation in dynamic health care, education, and community based systems. Opportunities for preliminary exploration of leadership theories and behaviors allow students to envision their unique contribution to the profession as a leader. Through self-assessment, self-reflection, readings, and active learning opportunities, students understand leadership within the context of broad practice and research settings in light of social and political press. Students apply this knowledge to defined leadership roles in clinical practice, academia and research. This knowledge sets the stage for students to become skilled and confident in recognizing and assuming leadership roles within a variety of venues at the community, state, national and/or global level.

OT 703	Professional Practice & Inquiry in Occupational Therapy	<p>Students will explore proposed doctoral capstone experience sites that have established a partnership with the Department of Occupational Therapy for innovative occupational therapy service delivery, student education and research. Students will participate in all onsite mentor Conference Calls in order to develop a deeper understanding of the mission and goals of each program. Based upon exposure to doctoral capstone experience sites, potential doctoral capstone projects, past OTD projects and didactic coursework students will develop an awareness of the dynamic roles of OT in various settings in light of sociocultural, socioeconomic, diversity and lifestyle choices geared to meet the needs of individuals and communities. Emphasis is placed on data management in relation to clinical practice and OTD project outcomes in order to orient students to potential projects, data analysis, interpretation, and measurement tools. The OTD student will identify personal and professional objectives and desired outcomes that will eventually serve as a springboard for the doctoral students' faculty-mentored individual doctoral capstone project. OTD students will identify doctoral capstone experience sites of interest and notification of a doctoral capstone experience placement is determined by the end of the fall semester of OT 703.</p>
OT 704A	Evidence Based Practice & the Data Driven Decision Making Process	<p>Students analyze their clinical practice during Level II fieldwork through reflection, clinical reasoning and the application of best available evidence to solve clinical problems. Students develop skill in generating clinical questions, implementing search strategies, conducting in depth literature reviews, critically analyzing literature and synthesizing best available evidence to answer clinical queries. Students are acclimated to the Data Driven Decision Making (DDDM) process. Students collect, analyze and share data on one client during the level II experience. This course is conducted online while students are participating in Level II fieldwork. This course uses the "electronic classroom", fieldwork experience, instructor guidance, and small cooperative group discussions to achieve course objectives.</p> <p>Prerequisite: OT 603 Research Design</p>
OT 704B	Evidence Based Practice & the Data Driven Decision Making Process	<p>Students analyze their clinical practice during Level II fieldwork through reflection, clinical reasoning and the application of best available evidence to solve clinical problems. Students develop skill in generating clinical questions, implementing search strategies, conducting in depth literature reviews, critically analyzing literature and synthesizing best available evidence to answer clinical queries. Students are acclimated to the Data Driven Decision Making (DDDM) process. Students collect, analyze and share data on one client during the level II experience. This course is conducted online while students are participating in Level II fieldwork. This course uses the "electronic classroom", fieldwork experience, instructor guidance, and small cooperative group discussions to achieve course objectives.</p> <p>Prerequisite: OT 480 and OT 704 A</p>
OT 705	Advanced Evidence Based Practice for the OTD Student	<p>In this doctoral course, students examine evidence-based practice in relation to their doctoral capstone experience placement site. In doing so, students advance the skills that are needed to conduct literature searches, appraise research literature and environmental considerations to ultimately translate evidence into practice by integrating "best" evidence in the doctoral capstone experience placement site. To prepare for leadership roles as doctoral-level occupational therapists students also develop the ability to articulate evidence in support of practice and achieve high level mastery in producing scholarly written work in the form of critically appraised paper and professional literature review and synthesis.</p> <p>Prerequisite: OT 480/482, OT 704 A & OT 704 B</p>

OT 706	Visionary Practice: Creating & Measuring Outcomes of Therapeutic Programs	<p>This course addresses the role of the practicing occupational therapy doctoral student as a program developer and evaluator. Students develop advanced knowledge and skill in implementing the processes of program design and evaluation, including the ability to design and implement an effective social assessment to examine an unmet need within an already existing program, and analyze the findings. Students also develop an occupational therapy program based upon the social assessment, epidemiological and environmental analysis that incorporates occupational therapy tenets, and reflects best practice and current evidence. Students also demonstrate knowledge and skill in writing a grant or a business plan for the proposed program.</p> <p>Prerequisite: OT 480/482, 704 A/B</p>
OT 707	The Doctoral Capstone: Preparing for the Capstone Experience and Capstone Project	<p>This course defines the expectations of the doctoral capstone experience and capstone project in relation to potential projects within the capstone experience in one or more of the following areas: clinical practice, research, administration, leadership, program and/or policy development, advocacy, education or theory. In collaboration with the course instructors, the OTD faculty mentor(s) and the Doctoral Capstone Coordinator (DCC) the OTD student will identify personal and professional objectives of the doctoral scholarly proposal and capstone project/experience that will be further developed and approved by the faculty mentor(s). Students will also identify a theoretical framework to support the scholarly proposal in OT 705. These activities are accomplished through learning activities over the course of the semester, where students will develop personal & professional objectives while reflecting on synchronous and asynchronous learning activities. Students will identify and reflect upon personal & professional strengths, skills and desired competency growth areas over the course of the semester in preparation for a final OTD competency audiovisual exam. The OTD competency exam will be submitted by the OTD student at the close of OT 707.</p> <p>Students are to successfully complete a Competency Exam prior to partaking in the doctoral capstone experience (OT 708 A/B) and corresponding third year courses: OT 709 A/B, OT 710 A/B and OT 711.</p> <p>Prerequisite: All coursework to date to include OT 480/482, OT 704 A/B</p>
OT 720	Doctoral Capstone Seminar A	<p>Through the Doctoral Capstone Seminar A course, OTD students will participate in opportunities with focus in one or more areas such as education, leadership, advocacy, clinical practice, theory development, research, administration, and policy and program development. Doctoral Capstone Seminar A will support the initiation and engagement in a doctoral capstone experience (minimum of 280 hours in the fall semester) along with the formation of an individual capstone project. Students engage in a three month, part-time (minimum of 280 hours) capstone experience and individual capstone project within a collaborative faculty-driven, student centric pre-identified program of study. The aim of the doctoral capstone experience is to ensure that the doctoral capstone reflects the sequence and scope of content in the curriculum design so the doctoral capstone can allow for development of in depth knowledge in the designated area of interest. The doctoral capstone experience must be consistent with the individualized student objectives and capstone project identified in OT 707 (the semester prior to the start of Doctoral Capstone Seminar A). In this seminar course, individualized student objectives and anticipated outcomes will evolve, based upon the doctoral capstone marker list, and with structured, weekly communication with and between the OTD student's faculty mentor and onsite mentor. In addition, course instructor(s) and doctoral capstone coordinator (DCC) will meet with OTD students through weekly synchronous forums. Course content and faculty mentorship support the development and eventual dissemination of an individual doctoral capstone project (occurring in Doctoral Capstone Seminar B) that reflects the synthesis of in-depth knowledge in the focused area of study. OTD doctoral students are required to meet the capstone project and experience expectations.</p>

OT 721	Doctoral Capstone Seminar B	<p>Through the doctoral capstone seminar B course, OTD students will continue to participate and focus in one or more areas such as education, leadership, advocacy, clinical practice, theory development, research, administration, and policy and program development identified in prior coursework. The doctoral capstone seminar B will support the ongoing engagement in a doctoral capstone experience (minimum of 280 hours in the spring semester) along with the ongoing implementation and eventual completion of an individual capstone project. Students engage in the second portion of a three month, part-time (minimum of 280 hours) capstone experience and individual capstone within a collaborative faculty-driven, student centric pre-identified program of study as determined in doctoral capstone seminar A. In doctoral capstone seminar B, individualized student objectives and anticipated outcomes continue to be met based upon structured, weekly communication with and between the OTD student's faculty mentor and onsite mentor. Course instructor(s) and doctoral capstone coordinator (DCC) and OTD students continue to meet through weekly synchronous forums focused on a variety of learning activities (leadership, branding, licensure, resume and job readiness) content. In addition, faculty mentorship further supports the development and dissemination of an individual doctoral capstone project that reflects the ongoing synthesis of in-depth knowledge in the focused area of study. OTD doctoral students continue to be required to meet the capstone project and capstone experience expectations as identified within the final faculty mentor evaluation of the OTD student, capstone project plan, as well as the final doctoral capstone marker list. The OTD project culminates with a polished onsite independent capstone project presentation and dissemination. OTD students will also create an electronic "linkedin" account that showcase the doctoral capstone experience and project. It is expected that the OTD student will disseminate findings through publication and/or share findings through a state, national, and/or international presentation venue.</p>
OT 727	Visionary Practice Development and Evaluation	<p>This core course in the OTD curriculum highlights the significance of a systematic needs assessment to guide new and innovative occupational therapy program development within an existing organization or current population. Coursework provides students with an opportunity to develop advanced skill in program design and evaluation processes, with opportunities to rely on their own professional expertise, multiple stakeholder perspectives, occupational therapy theory and current research evidence, to propose a program design and evaluation plan that addresses an identified unmet need. Students briefly explore potential funding sources to launch new occupational therapy programs and consider issues to sustain program initiatives beyond their pilot phase.</p> <p>Prerequisites: OT778 Advanced Evidence Based Practice and OT782, Leadership. Offered in Fall and Spring semesters.</p>
OT 751	Neuroscience Foundations for Practice	<p>This course introduces the student to the specialized field of neuroscience. A review of the structure and function of the nervous system will provide the foundation for system neuroscience. Students will cover sensory and motor systems, neuroplasticity and higher-level cognitive functions. Students will participate in learning experiences to integrate knowledge of neuroscience as a foundation for practice.</p>
OT 753	Advanced Concepts in Neuroscience I	<p>This course emphasizes neuroscience-based assessment and intervention strategies that guide rehabilitation practice. Contemporary, evidence-based strategies are presented followed by the integration and application of these principles to practice. Intervention discussions include the proposed mechanisms for rehabilitation/recovery with discussion of application to practice. Development of interventions that can be replicated and use of assessment data to guide interventions choices are discussed.</p>

OT 761	Autism: The State of the Field	This course is designed to provide an overview of ASD including diagnosis, etiology, and core and associated features in order to understand how these impact participation for individuals on the spectrum and their families. Students will investigate the specific issues of ASD that manifest at particular times across the lifespan including early childhood, school-age, adolescence and adulthood. Finally, these topics will lead into in an overview of and practice with the Data Driven Decision Making Process in occupational therapy practice to provide quality, occupation-centered care to individuals with ASD and their families.
OT 766	Assessment and Intervention Strategies for Individuals with Autism Spectrum Disorder	This course focuses on assessment and intervention strategies for those with autism across the lifespan. Common assessments used for making a diagnosis of ASD, as well as assessment measures for individuals with ASD used to identify factors impacting participation in home, school, play and community activities are included. Selection of evidence-based interventions that include the client and therapist perspectives are addressed. Through use of the Data Driven Decision Making process, students analyze assessment data to design interventions for persons with ASD and consider their application into practice.
OT 770	Knowledge Translation to Promote Best Practice	This course provides clinicians with an introduction to practical knowledge translation theories and methods that are used to promote integration of new research knowledge and best practices in a variety of practice settings and circumstances. A primary focus of the course is to identify a theory and key strategies to encourage application of the student's learning within previous coursework in their practice setting.
OT 778	Advanced Evidence-Based Practice	Students examine evidence-based practice from conceptual, empirical, practical and personal perspectives. Students develop skills, knowledge, and confidences that are needed to conduct literature searches, appraise research literature and, translate evidence into practice by integrating "best" evidence, client values and priorities, their own personal experiences and environmental considerations. To prepare for leadership roles as advance-practice and doctoral-level therapists, students also develop research literacy for EBP, an understanding of knowledge translation, and high level mastery in producing scholarly work in the form of critically appraised papers, poster presentations and literature synthesis. In support of these outcomes, students learn to develop clinical questions using the PICO framework; explore and gain experience using a variety of EBP resources including TJU Scott Library resources, Lib guides, self-paced tutorials, books, articles and, videos; utilize search engines and terms to search for relevant research literature; make decisions about measurement tools based on the understanding of sound psychometric principles; apply knowledge about research design and methods to effectively critique papers; develop statements of the "clinical bottom line" based on understanding of evidence; appreciate, identify and defend evidence of all sources; articulate the role of theory in EBP and the tenets of knowledge translation methodologies and; critically reflect upon their own characteristics as an EBP clinician and the transformation in thought and action as a result of confidences, knowledge and skills gained in the course. This course supports interactive learning that encourages critical thinking and scholarly debate among Jefferson's occupational therapy doctoral students, post-professional certificate students, faculty and, other professionals. Students participate in synchronous and asynchronous learning experiences that promote the socialization process of advanced practice therapists, and doctoral prepared occupational therapy leaders. Offered in Fall semester.
OT 782	Leadership: Moving Beyond Traditional Roles	This course offers students an opportunity to explore leadership theory and to carve out their unique contributions to the profession as a leader. Students develop an understanding leadership within the context of the wider health systems and social and political press and apply this knowledge to defined leadership roles in clinical practice. Course activities highlight communication, written and oral, as a foundational skill of a leader. Course activities include skill development in data management and analysis as a subset of communication skills necessary for leadership. Offered in Spring semester.

OT 783	Bridging the Gap between Classroom & Clinical Practice	Gain an in-depth review of strategies and best practices to prepare entry-level students to enter clinical practice and integrate OT theory and research into practice. Learn methods that encourage and capitalize upon the mutual flow of ideas between educator and clinician and have the potential to move practice forward. Identify the key strategies of educator/clinician collaboration and negotiation to enhance the use of evidence in daily clinical practice.
OT 784	College Teaching in the Digital Age	Review the history, theory and trends in higher education that will equip learners with the foundational knowledge necessary for teaching roles in academic settings. Examine the theoretical basis and practical application of specific teaching strategies that can be applied in online, classroom and clinical settings. Examine topics related to learner issues/needs, motivation and diversity and study principles of course development and delivery of instruction through traditional strategies and newer technologies for online education such as blogs, wikis, web conferencing and virtual environments.
OT 785	The Evidence Base of Teaching: Advanced Curriculum Develop	Gain a comprehensive introduction to course development, implementation and evaluation within the context of applicable standards, learning theory and college/university mission. Integrate educational theory, research and practice using a full range of delivery strategies including traditional lecture and laboratory formats as well as newer formats such as stimulations, asynchronous and synchronous online discussion, wikis, blogs and podcasts. Synthesize concepts and skills from previous courses in the Teaching Certificate (must be taken as the last course in the certificate)
OT 786	Health Literacy	Health and human service professionals often work with clients and populations with low health literacy while unaware of the severe consequences this has on practice and health outcomes. Thus, health and human service professionals must take action to empower clients to make positive health decisions. This course will provide a comprehensive review of health literacy, strategies for effective health communication, methods of empowering clients to navigate challenges in accessing health care resources, applications of health literacy in the community; use of virtual worlds in promoting health literacy; and review of instruments to evaluate consumer and health professional's knowledge of health literacy. Course participants will evaluate their environments for consistency with health literacy principles and develop new strategies to promote health literacy. Offered in Summer 2 semester.
OT 797	Cultural Competence & Humility	This course provides an in-depth and advanced understanding of what it means to be culturally competent health/human service practitioner and to facilitate development of cultural competence and humility in one's self, colleagues and the work environment. The course first reviews critical background information related to diversity, disparities in health status and access to quality care and cultural competence while simultaneously focusing on students' personal experience and reflection about these issues. As the course progresses, students apply knowledge and insight to their own professional areas of health and human services practice. Students develop an individual or community health initiative that reflects their learning of cultural humility and competency from the course. The final project is an action plan that promotes diversity and cultural awareness in their professional development and organizational settings, that also helps inform policies within larger contexts such as public health initiatives. Offered in Spring semester.

OT 798	Occupational Therapy Doctorate (OTD) Seminar	<p>This seminar series, consisting of Seminar A, B, and C is designed to facilitate doctoral students' entrée into and continued progression through Jefferson's PP-OTD program. Seminar A is taken at the beginning of the program. Seminar A provides an introduction to the post-professional clinical doctorate (PP-OTD), including entrepreneurship, and AOTA Vision 2015. Seminar B (listed as course name Doctorate Seminar BC) is taken later in the program, after the student has focused on a final project and has identified a Faculty Mentor. Pre-requisites are OT 778: Advanced EBP and OT 782: Leadership. Completion of OT 727: Visionary Practice is highly recommended. In Seminar B, students write a conceptual foundations paper that details the basis of the Doctoral project. Seminar C is taken after successful completion of Seminar B. Seminar C (listed as course name Doctorate Seminar BC) is the doctorate seminar in which students write the Fellowship Proposal and fully develop the plan for the final doctoral project. Offered in all semesters.</p>
OT 799	Seminar in Clinical Research	<p>This seminar series, consisting of Seminar A, B, and C is designed to facilitate doctoral students' entrée into and continued progression through Jefferson's PP-OTD program. Seminar A is taken at the beginning of the program. Seminar A provides an introduction to the postprofessional clinical doctorate (PP-OTD), including entrepreneurship, and AOTA Vision 2015. Seminar B (listed as course name Doctorate Seminar BC) is taken later in the program, after the student has focused on a final project and has identified a Faculty Mentor. Pre-requisites are OT 778: Advanced EBP and OT 782: Leadership. Completion of OT 727: Visionary Practice is highly recommended. In Seminar B, students write a conceptual foundations paper that details the basis of the Doctoral project. Seminar C is taken after successful completion of Seminar B. Seminar C (listed as course name Doctorate Seminar BC) is the doctorate seminar in which students write the Fellowship Proposal and fully develop the plan for the final doctoral project. All doctorate seminars are offered Fall, Spring, & Summer (register for Summer 1, extends into August).</p>
OT 800	Doctoral Fellowship	<p>The clinical fellowship is an individualized, intensive immersion into an area(s) of occupational therapy (practice, policy, program development/evaluation, and teaching/instruction) practice that the student is interested in advancing their clinical proficiency, utilizing current research evidence, and demonstrating leadership and entrepreneurial skills. Students design and implement a doctoral level project tailored to their needs and interest areas, including program design and evaluation, creation of new practice models, and/or clinical research. Offered every semester.</p>
OT 801	Doctoral Capstone	<p>The Doctoral Capstone provides an in-depth opportunity for students to further pursue an individually designed doctoral level project that synthesizes their knowledge, attitudes and skills and enables them to achieve specific competencies related to advanced practice. The project builds upon knowledge gained throughout the Occupational therapy doctoral (OTD) program, including 1) the use of research evidence to make clinical decisions, 2) leadership and change within systems and treatment contexts, and 3) development of theory-based innovative programs to meet the needs of a variety of areas and society at large. Students enhance and synthesize the above knowledge, attitudes, and skills through completion of the Doctoral Fellowship. In the Doctoral Capstone, students then further synthesize the knowledge, attitudes, and skills learned from their substantive Fellowship project and disseminate findings through publication in an occupational therapy or other professional journal, with their Jefferson faculty mentor as co-author. Content expert(s) may also serve as co-authors if appropriate (see guidelines for authorship, http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html). In addition to developing the final doctoral project for submission to a peer-reviewed journal, students also are strongly encouraged to share their findings through state, national, and/or international presentations. Offered every semester.</p>
OPERATIONAL EXCELLENCE		

OPX 516	Teaching Operational Excellence	In this course, students will examine the principles of effective adult-based education; evaluate strategies to increase learner satisfaction and knowledge retention; discuss how to implement a 'backwards design' curriculum development strategy for learners; and identify methods to assess learner satisfaction, knowledge attainment, and skill development. Students will also create a lesson plan for an educational program in Operational Excellence.
OPX 520	Change Management	Presents and applies rapid improvements as a transformation strategy for cultural and process related change in healthcare settings that require management of multidisciplinary teams. Develops a framework for healthcare transformation by applying tools to DMAIC and the eight stages of change: 1) Create a sense of urgency 2) Build a guiding coalition 3) Form a strategic vision and initiatives 4) Enlist a volunteer army 5) Enable action by removing barriers 6) Generate short-term wins 7) Sustain acceleration 8) Institute Change
OPX 525	Executing Lean Improvements	Presents and applies Lean methodology as a key tool for process improvement in healthcare settings that require management of multidisciplinary teams. Develops a framework for creating Lean processes, focusing on five principles; 1) Define Value, 2) Map the Value Stream, 3) Establish Flow, 4) Implement Pull, and 5) Strive for Perfection. Compares and contrasts Lean with other process improvement strategies and methodologies used in healthcare to evaluate strengths and weaknesses of the various approaches.
OPX 530	Applied Leadership Strategies for Effective Change	Examines the application of leadership strategies for sustaining effective change in the current value-based, healthcare environment using the case study method for learning. Critiques four case-based scenarios to identify and analyze the major uncertainty or dilemma in the case. Analysis considers the impact and outcomes of leaders employing diverse, strategic, data-driven healthcare decisions with the integration of leadership models and theory, and organizational and improvement science in the diagnosis, development and implementation of change interventions. Uses various assessment techniques as a framework in formulating hypothesis for presenting the case problem, analyses and strategic leadership recommendations or proposals for sustaining the efforts by a case protagonist for effective change.
OPX 531	Evaluating Healthcare Organizations	The purpose of this course is to provide an understanding of the myriad ways health care organizations are evaluated. The curriculum reviews regulatory, financial, ranking, satisfaction, and quality evaluation methods, their strengths and weaknesses, and requires students to understand how the nature and value of an organization's performance depends on the vantage point of the assessor. Students will be assigned health care markets for evaluation, using institutions as examples to develop their own opinion on where they would go to receive care, where they would choose to work, or where they would rank an institution's performance. The course builds to the final presentation of each student's own version of a preferred evaluation methodology.
OPX 532	Project Management Essentials	Provides the foundation, tools, and strategies for project management and execution. Builds on prior course content through use of established guidelines and standards developed by the professional project management community. In alignment with the DMAIC improvement model, the project management framework includes: 1) Initiate; 2) Plan; 3) Execute; 4) Monitor & Control; and 5) Close. Compares and contrasts project, program, and portfolio management as it relates to healthcare improvement strategies.

OPX 535	Strategic Execution	<p>This course explores and applies key concepts to drive performance improvement in healthcare settings. Designs improvement approaches to address system, mid-level, and front-line problems as appropriate. Provides theory and application of continuous improvement. Develops strategies to align high-level objectives with improvement efforts.</p> <p>Operational Excellence requires the relentless focus on continuous improvement. Strategic Execution provides the framework to design systems and processes to drive outcomes. The disciplines of execution outline best practices that can be leveraged to achieve consistent, high levels of performance. There are always more good ideas than the capacity to implement. With Strategic Execution, students learn how to define and prioritize the vital few goals and coordinate the resources and teams required to effect positive change.</p>
OPX 540	Baldrige	<p>Presents and provides students with a working knowledge of the Malcolm Baldrige Performance Excellence Program. Explores the five stages and essential elements, known as the LASER model, of the organizational journey to sustained high performance. Established through the National Institute of Standards and Technology (NIST), an agency of the U.S. Department of Commerce, the Malcolm Baldrige National Quality Award (MBNQA) program was developed to: 1) identify and recognize role-model businesses, 2) establish criteria for evaluating improvement efforts, and 3) disseminate and share best practices. Provides each student with a working understanding of the Baldrige Performance Excellence criteria, how to apply that criteria to an organization, and how to generate meaningful opportunities for organizational improvement based on their responses and interpretations of the criteria.</p>
OPX 650	Capstone Seminar & Project	<p>The Capstone Seminar and Project is the final course in the OPX Master degree program. Using the OPX framework and tools learned throughout the program, students demonstrate a broad and deep knowledge of their field in identifying a well-focused and significant OPX problem or research question for their project. Students engaged in self and peer critiques of work using the JCPH Capstone Guidelines. The end deliverable is a comprehensive A3 post presentation and manuscript submission to a relevant, peer-reviewed academic journal.</p> <p>Prerequisite(s): All required MSOE courses.</p>
ORGANIZATIONAL LEADERSHIP		
LDSP 510	Team Dynamics and Collaboration	<p>Teamwork and collaboration are skills necessary to lead in a high-performance global workplace. This course will focus on team dynamics, roles and behaviors, communication, ethical integrity and conflict resolution within teams. Students will learn how to build effective team members that provide team-based solutions and to use conflict to spark new ideas and creative thinking.</p>
LDSP 515	Organizational Innovation, Creativity & Change	<p>Change management is the discipline that guides how we prepare, equip and support individuals to adopt change in order to drive organizational success and outcomes. Innovation involves large-scale and highly complex organizational change through creative leadership. This course teaches students how to work across boundaries, plan and execute change.</p>
LDSP 520	Strategic Leadership in a VUCA World	<p>Leaders are in the midst of a VUCA world - volatility, uncertainty, complexity, and ambiguity. This course will focus on leadership strategies necessary to overcome these challenges - vision, understanding, creativity, and agility/adaptability. Students will learn the integrated application of strategy and leadership, establishing the capacity to anticipate, challenge, interpret, decide, align and learn in order to lead a successful and effective organization.</p>
LDSP 580	Human Relations and Employee Development	<p>This course is key to organizational knowledge and focuses on the leader's ability to understand and know how to use human resources measures to make informed decisions that influence a leaders' strategy and positively affect the organizations' performance. Employee development is a set of integrated organizational processes designed to attract, develop, motivate, and retain productive, engaged employees.</p>

LDSP 590	Organizational Awareness	This course gives students the ability to learn and understand the organizations' structure through decision-makers, power relationships, influencers, and networks. Leaders need to understand the forces at work in an organization as well as the guiding values and unspoken rules that operate among people. Organizational awareness will help guide strategy to accomplish goals in any organization or network, no matter the setting.
LDSP 605	Leading in the Digital Age	Digital technology is redefining the way organizations do business and engage consumers. Students will learn how to strategize through utilizing frameworks for mastering digital leadership and transform organizations. Students will explore the latest technologies and learn how to leverage digital, social, and mobile marketing tools to drive innovation and spur growth.
LDSP 610	Organizational Performance Metrics	This course teaches students how to understand an organization or department's performance through various metrics. Students will learn how to read and analyze the following metrics to improve performance: financial, customer, process, people, performance measurement, marketing, and Key Performance Indicators (KPI).
LDSP 620	The Psychology of Global Leadership	This course develops the students' global mindset by understanding the global environment in which international organizations take place in addition to the role and behavior of international organizations as they respond to the environment. The organizational leader will have knowledge of local markets' culture and customs, develop multinational strategies, collaborate and influence, and manage globally diverse teams.
LDSP 625	Consulting I	This consulting foundations course builds the knowledge necessary for success in the role of consultant. The student will learn various techniques in the areas of strategy formulation, market research, operations, performance management and project management. Skills will be gained in contracting, collecting, analyzing, and presenting data.
LDSP 630	Systems & Design Thinking	This course will assist leaders in viewing an organization holistically, and the ability to examine and connect linking parts. Students will have the ability to understand and tackle complexity and produce significant results to guide organizational effectiveness and change. A structured approach will emphasize examining systems and problems more completely and accurately before developing and implementing solutions.
LDSP 640	The Psychology of Conflict and Negotiation in Organizations	Students will understand and discover the importance of conflict analysis as central to the context and content of any conflict. Conflict analysis tools will be applied to various case studies. This course examines both theoretical and practical implications of diverse assumptions and strategies. Students develop a deeper self-awareness of their role in the creation, perpetuation, escalation and resolution of conflicts through negotiation.
LDSP 699	Capstone	This course offers students an opportunity to increase their impact and effectiveness as a leader. Students will use their culmination of knowledge learned throughout the program and base their paper on one of the following: research, applied or externally-oriented projects. Details for the capstone are provided in the Capstone Handbook.
PA STUDIES-East Falls		
PASF 503	Evidence Based Medicine	This lecture and seminar course provides a foundation for clinical decision making that will be necessary for the future practice of the physician assistant student. The course teaches the basic principles of evidence-based medicine and how to apply them to clinical decision making. Students will learn basic principles of evidence-based medicine, how to formulate a good clinical question, how to access and search the literature, how to evaluate the validity of the literature and how to apply it to answer a clinical question. Practice using case based scenarios to apply the principle that they have learned.

PASF 507A	Advanced Human Anatomy A	This lecture and laboratory course will review basic histology along with the major anatomical structures of the human using a regional organization. Laboratory sessions utilizing microscopic examination, models and cadaver specimen dissection will augment lecture material.
PASF 507B	Advanced Human Anatomy B	This lecture and laboratory course will review basic histology along with the major anatomical structures of the human using a regional organization. Laboratory sessions utilizing microscopic examination, models and cadaver specimen dissection will augment lecture material.
PASF 510	Medical and Professional Ethics	Medical and Professional Ethics Understanding the philosophical principles related to biomedical ethics, patient-practitioner relationships and the role of the physician assistant provider within the health care system are the main topics encompassed in this lecture and discussion seminar course.
PASF 511	Applied Behavioral Science	Applied Behavioral Science The topics of, abnormal psychology, human sexuality, trauma and stress responses, substance abuse, behaviors related to psychological health and illness and the diagnosis and management of common psychological disorders are the focus of this lecture course.
PASF 513	Medical Physiology and Pathophysiology	This lecture course is designed to teach the principles of human medical physiology along with the physiological mechanisms of common disease states.
PASF 517	Medical History and Physical Diagnosis	Medical History and Physical Diagnosis This lecture and practical laboratory course will introduce the physician assistant student to the techniques for eliciting a comprehensive medical history and performing a complete physical examination on humans. The interpretation of history and physical examination findings as applicable to physiological and disease states will also be discussed. In the lab, students will practice physical examinations on each other. Methods of assessment include written and practical exams. Hospital experiences and writing assignments will enhance the learning experience.
PASF 521	Medical Genetics, immunology and Microbiology	Medical Genetics and Microbiology This lecture course presents current concepts and issues in medical genetics, immunology and microbiology. It focuses on diseases of genetic origin, the function of the immune system and emerging trends in disorders caused by microorganisms.
PAST 603	Advanced Physical Assessment	This integrative seminar course is designed to synthesize history taking and physical diagnosis skills with the medical, diagnostic and pharmacologic knowledge gained throughout the didactic phase of the PA program in order to apply it . Working in small groups and individually, students will elicit a history, perform an appropriate physical exam, order and/or interpret diagnostic tests, develop treatment plans and recommend appropriate interventions. This course includes small group and individual written assignments to enhance the learning experience.
PAST 605	Clinical Correlations of Public Health	Clinical Correlations of Public Health Clinical Correlations of Public Health is a lecture and group discussion course that will allow physician assistant students to gain a fundamental understanding of public health, health policy, and its impact on clinical practice. In addition, this course will provide practical approaches for physician assistant students to provide appropriate patient education for patients with modifiable risk factors for disease. Prerequisite: PAST-612; Corequisite: PAST-612

PAST 611	Clinical Medicine	<p>This lecture course uses an organ-system organization to present an overview of the pathophysiology, clinical manifestations, diagnostic evaluation and management of common diseases encountered in primary care. The course includes modules in: epidemiology, infectious disease, cardiology, pulmonology, gastroenterology, hematology/oncology, endocrinology, nephrology, urology, rheumatology, neurology, dermatology, ophthalmology, otorhinolaryngology (ENT) and psychiatry. Principles of health promotion and disease prevention are also presented.</p> <p>Prerequisite :PASF-507PASF513PASF-517 Corequisite: PAS-612</p>
PAST 613	Pharmaco-Therapeutics	<p>This lecture and case study seminar course is designed to introduce students to the principles of pharmacology, including the absorption, bioavailability, distribution, metabolism, excretion, classification and mechanism of action of commonly prescribed medications. Additionally, this course will give students an understanding of how drugs are used in clinical practice, including the clinical indications, contraindications, dosing, side effects and monitoring of commonly used medications.</p> <p>Prerequisite: PAS 413 or PASF 513</p>
PAS 614	Emergency Medicine	<p>This lecture and laboratory course encompasses emergent presentations, diagnosis and management of common medical and psychiatric emergency-care problems and trauma. Laboratory sessions introduce students to procedures necessary for the delivery of emergency medical care utilizing a lecture component, demonstration, and hands-on practice.</p> <p>Prerequisite: PAST 413 or PASF 513</p>
PAST 615	Diagnostic Medicine	<p>Diagnostic Medicine In this lecture and small-group based laboratory course is designed to provide students with the functional knowledge in clinical laboratory medicine, radiological imaging and other diagnostic modalities used for diagnosing, treating, and managing patients.</p> <p>Corequisite: PAST 611</p>
PAST 616	Clinical Reasoning	<p>Clinical Reasoning This small group seminar course uses clinical case studies and role-playing to guide students in the development of directed history and physical examination, clinical reasoning, case presentation and patient counseling skills. Application of evidenced based medicine principles to clinical scenarios will be integral as part of patient management. Finally, various forms of medical documentation will be introduced and practiced.</p> <p>Corequisite: PAST 611</p>
PAST 621	Clinical Disciplines Overview (CDO)	<p>During this lecture and workshop course, the physician assistant student is introduced to the basic principles of diagnosis and treatment in the medical disciplines of pediatrics, surgery, and reproductive and sexual health.</p> <p>Prerequisite: PAST 611</p>
PAST 622	Pharmaco- Therapeutics Seminar	<p>This course will use small-group, case-study, problem-based seminars to demonstrate the practical utilization of medications in the clinical setting. Prescription writing, dosing, titration and ongoing monitoring will be the focus of the course.</p> <p>Prerequisite :PAST-613 PAST-614</p>
PAS 623	Advanced Diagnostic Medicine Seminar	<p>Advanced Diagnostic Medicine Seminar This case based seminar course builds upon the foundation of knowledge gained in the Diagnostic Medicine course and engages students in the application of that knowledge. Principles of appropriate health screenings are also introduced.</p> <p>Prerequisite:PAST 615</p>

PAS 741, 742, 743, 744, 745, 746, 759, 760. 763, 764,	Internal Medicine Rotation	The physician assistant student will complete ninesix (5- to 6-week) rotations in the following clinical areas: Internal Medicine, Pediatrics, Surgery, Primary Care 1 & 2, Women's Health, Behavioral Health, Emergency Medicine, Elective rotation. Prerequisite: Complete all other PA didactic course work before registering for clinical rotations.
PAST 762	Transition to Clinical Practice	This lecture and laboratory based course is designed as a transitional course to provide the students with the needed skills to effectively navigate their learning and the clinical setting. The laboratory portion of this course will teach commonly utilized clinical procedures and skills which students will be performing while on rotations.
PAS 772	Masters Comprehensive Experience	This course, which takes place throughout the entire clinical year, is the capstone experience of the PA program. Prerequisite :Complete all PA professional didactic courses before registering for PAST 772
PA STUDIES FOUNDATION		
PASF 503	Evidence Based Medicine	This lecture/seminar course provides a foundation for clinical decision making that will be necessary for the future practice of the physician assistant student. The course teaches the basic principles of evidence-based medicine and how to apply them to clinical decision making. Students will learn basic principles of ecidence-based medicine, how to formulate a good clinical question, how to access and search the literature, how to evaluate the validity of the literature and how to appple it to answer a clinical question. After the foundational principles have been presented through lectures, students will work in small groups to practice using case based scenarios to appple the principle that they have learned.
PASF 507	Advanced Anatomy	This lecture and laboratory course will review basic histology along with the major anatomical structures of the human using a regional organization. Laboratory sessions utilizing microscopic examination, models and cadaver specimen dissection will augment lecture material.
PASF 507A	Advanced Anatomy	This lecture and laboratory course will review basic histology along with the major anatomical structures of the human using a regional organization. Laboratory sessions utilizing microscopic examination, models and cadaver specimen dissection will augment lecture material.
PASF 507B	Advanced Anatomy	Consideration of the various classifications and symptomatology of psychopathological disorders ' their origin, assessment, prognosis, treatment and prevention. Prerequisite:PSYCH 101 Minimum Grade of D
PASF 510	Medical & Professional Ethics	Medical and Professional Ethics Understanding the philosophical principles related to biomedical ethics, patient-practitioner relationships and the role of the physician assistant provider within the health care system are the main topics encompassed in this lecture and discussion seminar course.
PASF 511	Applied Behavioral Science	Students will examine the interplay between the disciplines of psychology and law. The course will examine the psychological and behavioral issues that impact the legal and criminal-justice systems, and how law and justice affect human behavior. Topics to be covered include crime and criminal behavior, victims, law enforcement, trials, witnesses, mental illness and criminal justice, corrections, family law, crime intervention and prevention. Prerequisites: PSYC 101 Minimum Grade of D
PASF 513	Medical Pathophysiology	Students will study the acquisition, activation, direction and retention of human and animal behavior. Topics to be covered include instincts, drive, conditioning and instrumental learning, human verbal learning and language learning and memory processes. Prerequisites: PSYC 101 Minimum Grade of D

PASF 517	Physical Diagnosis Diagnosis	Study of human thinking, memory, problem solving and the relationship between damage to the cortex and information processing. Empirical research and applied examples and demonstrations will be presented to address such topics as the content of memory, memory improvement, strategies and approaches for solving different kinds of problems, and pathologies and problems of thought.
PASF 521	Med Genetics & Microbiology	Medical Genetics and Microbiology This lecture course presents current concepts and issues in medical genetics, immunology and microbiology. It focuses on diseases of genetic origin, the function of the immune system and emerging trends in disorders caused by microorganisms.
PATHOLOGY & CELL BIOLOGY (JCLS)		
PA 510	Concepts-Cell Biology	An overview is provided of structure-function relationships in mammalian cells and subcellular structures.
PA 570	Pathologic Asp of Diseases	The course will cover topics in general and systemic pathology, providing an overview of major aspects of human pathology and the pathophysiology of major diseases. Lectures supplemented with computer module containing case studies, clinical correlations and self-assessment components.
PA 610	Pathology	Material is presented by organ systems, and emphasis is on pathogenesis, pathologic physiology, and clinicopathologic correlations of human diseases. Instruction consists of formal lectures (7-8 hours per week), laboratory sessions, small group conferences, demonstration of gross specimens, visits to the morgue. The course also includes reviews of histology and gross pathology with the aid of photographic transparencies and clinicopathologic conferences in conjunction with the clinical departments.
PA 611	Adv Topics-Cell Biology	This course offers an in-depth treatment of selected areas of cell biology, focusing on topics that are currently receiving a great deal of attention and largely based on research interests of faculty members of the Department of Pathology, Anatomy and Cell Biology. The course consists of four distinct sections of two weeks each, with different topics being covered in each of these sections.
PA 710	Seminar	Journal Club. Postdoctoral fellows and graduate students discuss recent research articles relative to their area of interest.
PA 720	Seminar	Journal Club. Postdoctoral fellows and graduate students discuss recent research articles relative to their area of interest.
PA 910	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
PA 920	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
PA 930	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
PHARMACEUTICAL SCIENCES		

PSCI 701	Pharmaceutical Sciences Seminar	The Seminar course will involve critical evaluation and discussion of research and current literature in Pharmaceutical Sciences. The student will assess, develop, and present an individual presentation focusing on a specific Pharmaceutical Sciences topic chosen in consultation with the Course Coordinator. This course aims to develop and enhance students' competency in delivering seminars on research topics in Pharmaceutical Sciences.
PSCI 702	Research Foundations and Ethics	The course introduces students to the ethics of laboratory research. There will be lecture and active case discussions. The course will cover responsible conduct of research. The course will also provide basic principles and methods of hypothesis generation, designing objectives, and project development.
PSCI 703	Pharmaceutical Sciences Rotation	The course will provide an opportunity for students to spend time in three laboratories during the semester. The rotations will include reading publications of the lab and understanding the research in each laboratory to help the students learn in learning various directions of research to identify laboratories where they would carry out the thesis research in their program.
PSCI 704	Molecular Pharmaceutical Sciences	The course is designed to develop a fundamental knowledge base of pharmaceutical drug dosage forms and drug delivery systems. The course will emphasize the fundamental concepts of physiochemical properties of drugs that are critical for their therapeutic effects. The course will also address in depth the formulation process, including novel technologies for preparing dispensable medicines. Concepts of medicinal chemistry and computational chemistry will be emphasized as they apply throughout the course.
PSCI 705	Biological Pharmaceutical Sciences	The course will cover the fundamental concepts of drug-receptor interactions, signal transduction pathways and molecular biology related as they relate to several diseases. The course will relate these principles to the pharmacology of the drugs. The course will encompass a discussion of primary literature.
PSCI 706	Special Techniques in Pharmaceutical Sciences	The course prepares students to understand and develop expertise in the methodologies used in the laboratory.
PSCI 798	Pharmaceutical Sciences Practicum	Students will learn to apply their knowledge to a scientific problem. The students will develop hypothesis, objectives and plan experiments to address the scientific problem. The students will search primary literature to understand for understanding the area of research and methods. The course will involve written and oral communications, as well as problem, solve methodology. The scholarly work could be published and presented at scientific meetings. The students will develop a deep understanding of the equipment for research and problem-solving. All compliance requirements, including safety are followed by the students enrolled in this research course.
PSCI 799	Pharmaceutical Sciences Research	Students will learn to apply their knowledge to a scientific problem. The students will develop hypothesis, objectives and plan experiments to address the scientific problem. The students will search primary literature to understand for understanding the area of research and methods. The course will involve written and oral communications, as well as problem, solve methodology. The scholarly work could be published and presented at scientific meetings. The students will develop a deep understanding of the equipment for research and problem-solving. All compliance requirements, including safety are followed by the students enrolled in this research course.
PHARMACOLOGY (JCLS)		

PR 500	Pharmacology	The course consists of lectures, correlations and discussions as well as laboratory exercises. The general fields of pharmacology and toxicology are covered, including the origins, chemical nature, mechanisms of action and interactions, of pharmacological agents, major effects, absorption and fate of drugs and poisons. Emphasis is given to the study of those drugs which are used in present day medicine and to the study of toxic agents most commonly affecting man. In the laboratory, the student gains an understanding of some of the mechanisms by which drugs may produce their effects, and becomes familiar with a variety of methods and procedures commonly employed in experimental pharmacology.
PR 522	General Pharmacology	Introduction to the basic principles of drug action, including molecular mechanisms, time and dose dependency of drug actions, pharmacokinetics, toxicity, resistance and tolerance, pharmacogenetics, mutagenesis, carcinogenesis, and drug development and evaluation.
PR 525	Clinical Pharmacology	The objectives of this course are to present the principles of clinical pharmacology and practical therapeutics, including understanding and application of basic pharmacokinetic principles, basic pharmacodynamic principles, drug regimen design, therapeutic drug monitoring, adverse drug reactions, drug discovery and drug developments, principles of clinical study designs, biostatistics and pharmacology analysis.
PR 526	Pharmaco-genomics	The goal of this course is to provide a detailed overview of pharmacogenomics and pharmacogenetics with an emphasis on how human genetic variation affects how individuals respond to drugs. A combination of overview lectures coupled with specific examples the role of pharmacogenomics and the implications of the pharmacogenomics of enzymes, receptors and transporters on the actions of drugs will be emphasized. Lectures will be provided by the course coordinator and guest lecturers in key areas during the course. Applicable molecular biological and informatics techniques and analytical methodology will be discussed.
PR 530	Fundamentals Biosafety	The purpose of this course is to provide students with a basic knowledge of biosafety as related to good laboratory practice. The course will begin with an introduction to Federal biosafety regulations, guidelines and standards, the role of the Biological Safety Officer in the institution and the epidemiology of laboratory-associated infections. Students will become familiar with: concepts in biotechnology and cell biology; means of exposure to bio-hazardous agents; hazard assessment in the laboratory; laboratory design criteria when using bio-hazardous agents; good laboratory practice, (GLP); decontamination, sterilization, disinfection and proper disposal of infectious waste; packaging and shipping of bio-hazardous material; biosafety training design and implementation; and special considerations related to gene therapy.
PR 540	Intro Structural Biology & Bioinformatics	The objective of this course is to lay the foundations of Bioinformatics and Structural Biology. Fundamental features of the structure of proteins and nucleic acids, and the relationship between structure, sequence and function will be explored with a combination of lecture and hands on computer experiments. The goal is to use the structural information and databases to design and analyze experiments to understand the biological function.
PR 610	Colloq of Cell Calcium	Calcium is one of the primary cell signals for integrating cell function in various physiological states. The course deals with the basic role of calcium in regulating cell membrane structure and function. The various calcium activated proteins, troponin, calmodulin, protein kinase C, parvalbumins, and calsequestration and other calcium binding proteins are considered in the context of cell regulation. The course consists of several lectures combined with student presentations of original papers selected. Each student is expected to participate in the colloquium on cell calcium. Students are graded on the basis of their participation. Two open-book quizzes are given and a final term paper is required in lieu of a final exam.

PR 612	Spec Topics-Pharmacol	Each year this course integrates knowledge derived from the various basic medical sciences, pertaining to a selected organ or system, for example, the heart, brain, kidney, liver, etc. The student may thus take the course in several successive years without repeating the subject matter. Classes are chiefly student presentations and discussions under the guidance of the instructor. Instruction is given in writing abstracts and papers for publication and in presenting papers at seminars and scientific meetings.
PR 613	Macromolecular Structure	We will study protein and nucleic acid structure and function, focusing on energetic forces that guide folding, and computer modeling to predict structures. To reveal protein and nucleic acid structures we will study optical spectroscopy (absorbance, fluorescence, circular dichroism), electrophoresis, mass spectroscopy, magnetic resonance spectroscopy, and X-ray crystallography. We aim to develop your critical, analytical and problem-solving abilities in structural biology. Lectures on Monday and Friday will be supplemented by problem sessions or hands-on experience on Wednesdays, in the classroom, laboratories, or offices.
PR 615	Special Topics-Cell Regulation	This course focuses on a critical analysis of current concepts of cell regulation mediated by hormones and second messenger signal transduction systems.
PR 618	Special Topics-Structural Biology	This course offers an analysis of current approaches for relating physical structure to biological function in specific systems, such as the interaction of hormone or drug molecules with protein or nucleic acid receptors.
PR 621	Colloquium-Eicosanoids	This course reviews current knowledge of the physiological and pharmacological aspects of the prostaglandins from macromolecular to organismic levels. The formation, metabolism, and biological effects of the prostaglandins, thromboxanes, prostacyclins, leukotrienes and their associated products will be discussed.
PR 625	In Vivo Pharm: Animal Models Dis	This course provides basic training for M.S. and Ph.D. students in animal pharmacology. The specific goals of the course are: 1) to provide basic principles of in vivo drug experimentation conducted on anesthetized and conscious animals. Principles of animal anesthesia, surgical procedures, pre- and post-operative care will be studied along with regulatory and ethical aspects of experimentation on small and large laboratory animals, 2) to provide basic knowledge and insights on animal models of human disease and the scientific and technical issues associated with the use of laboratory animals in drug development. Principles of pharmacodynamics and pharmacokinetics will be introduced, along with major organ and systemic pharmacology of the heart, kidney, brain, blood vessels, and the pulmonary system, 3) to provide an opportunity to acquaint students with modern pharmacology research in an industrial set-up and the fundamentals of the processes of drug discovery.
PR 630	General Toxicology	This course will introduce students to the principles and practices of Toxicology. Emphasis will be given to the comprehensiveness of toxicology as opposed to individual academic interests. While introductory courses in biochemistry, physiology, anatomy, and pharmacology would be helpful, they are not necessary since each topic will be covered as an introduction to the subject matter.
PR 631	Neuropsychopharmacology	The course begins with a review of basic neurochemistry, neuroanatomy, and neurophysiology as it relates to nerve conduction and neurotransmission. This is followed by a discussion of the various theories of the biochemical basis of anxiety, depression, aggression, schizophrenia and movement disorders and of drugs used in the treatment of these disorders including site and mode of action. In each case, animal models of a particular disorder are described.
PR 632	Metabol-Foreign Compound	A general consideration of the biotransformation of drugs, the influence of genetic factors and enzyme induction on such transformations, and the importance of these factors in therapeutics.

PR 635	Clin Pharmacotoxicology	This course gives the student an understanding of the concepts, knowledge, and skills which provide the basis for applications such as effectively providing consultative and laboratory testing services. Students will also become familiar with other aspects of pharmacotoxicology, such as research and development, quality assurance/quality control, education, and training relating to prevention, diagnosis, and treatment; forensic and regulatory aspects of harmful/toxic effects of exogenous chemicals.
PR 636	Experimental Therapeutics	This course is intended to be an advanced course in which students will learn about experimental and emerging therapies for human disease and the methodologies leading to their discovery and development. The course will begin with an overview of molecular biology as it relates to the drug process. The role of the pre-clinical and clinical investigations of candidate compounds will then be considered. Key developments and approaches in conventional and non-conventional drug design, representative of experimental therapeutics, will be analyzed on a topic-by-topic basis, where the pharmacological and basic science perspective of each topic can be evaluated.
PR 640	Research Rotation I	Supervised research in faculty laboratories. This course provides formal training in experimental design and laboratory methods by performing research rotations in the laboratories of different preceptors who are working on diverse problems in molecular pharmacology and structural biology. The course is a prelude to selection of a research advisor. Emphasis is placed on development and appreciation of experimental approaches to problems in the field, recording and interpretation of data, and logical and lucid reporting of experimental results.
PR 650	Research Rotation II	Supervised research in faculty laboratories. This course provides formal training in experimental design and laboratory methods by performing research rotations in the laboratories of different preceptors who are working on diverse problems in molecular pharmacology and structural biology. The course is a prelude to selection of a research advisor. Emphasis is placed on development and appreciation of experimental approaches to problems in the field, recording and interpretation of data, and logical and lucid reporting of experimental results.
PR 660	Research Rotation III	Supervised research in faculty laboratories. This course provides formal training in experimental design and laboratory methods by performing research rotations in the laboratories of different preceptors who are working on diverse problems in molecular pharmacology and structural biology. The course is a prelude to selection of a research advisor. Emphasis is placed on development and appreciation of experimental approaches to problems in the field, recording and interpretation of data, and logical and lucid reporting of experimental results.
PR 670	Biotechnology	The chemistry and applications of solid phase peptide synthesis, oligonucleotide synthesis, and the sequencing of proteins and DNA will be covered. Heavy emphasis will be placed on instrumental approaches to problems in modern molecular genetics and cellular biology. Among topics to be included in this section are the uses of computers as research tools (molecular modeling/molecular dynamics; X-ray crystallography and NMR analysis; use and availability of database; use and availability of data analysis packages). Other instrumental topics will include LASER-assisted cell sorting, image analysis, quantitative and qualitative spectroscopy (CD, ORD, IR, UV and fluorescence). The last section of this course will cover recent developments and methodologies in immunology (hybridoma techniques, Western blot, ELISA etc.).
PR 680	Molecular Pharmacology	This course focuses on regulation of cell function through an understanding of hormone, neurotransmitter and drug action at the molecular level. Specific emphasis will be placed on the mechanisms by which cell surface receptors, GTP binding proteins, effector enzymes and ion channels mediate signal transduction in the cell.

PR 690	Pharm-Center Nervous System	The overall objective of this course is to provide graduate students with an understanding of how therapeutic and non-therapeutic drugs affect brain function. The series begins with several lectures devoted to fundamental neurobiology including introductions to neuroanatomy and neurophysiology. These are followed by presentations on specific topics of neurochemistry and neuropharmacology as they relate to the biochemical basis of specific diseases and disorders of the brain. The series is complemented by sessions focusing upon animal models, research directions, and clinical applications.
PR 699	Independent Study	This course will allow students to pursue individual areas of interest while working jointly with a faculty member.
PR 710	Seminar	Presentation of research reports and review of special topics by faculty, graduate students, and speakers invited from other institutions.
PR 720	Seminar	Presentation of research reports and review of special topics by faculty, graduate students, and speakers invited from other institutions.
PR 730	Seminar	Presentation of research reports and review of special topics by faculty, graduate students, and speakers invited from other institutions.
PR 760	Case Studies-Clinical Pharmacology	This course examines the application of Clinical Pharmacology fundamentals employing a practical, case-oriented approach. Employing real-life cases, the problem solving will be more realistic, and the learning better reinforced. This 'case approach' has been used in leading medical and business schools for many years. The fundamental topics of clinical pharmacology that were initially presented in Pharmacology 525 or 401 will be applied here in clinical scenarios to reinforce the educational process. These include pharmacokinetics, pharmacodynamics, therapeutic drug monitoring, drug interactions, drug metabolism, adverse drug reactions, pharmacogenetics, elements of biostatistics and clinical trials, and dosage regimen design.
PR 810	Pharmacology Clerkship	To gain experience and proficiency in the clinical and/or research applications in pharmacology, students will become familiar with state-of-the-art instrumentation and specialized research techniques in microbiology, immunology and/or molecular biology through placement in a clinical or research laboratory of the University or in an affiliate institution or their place of employment. The type of research laboratory and duration of training for this experience and hence the credit hours, will vary depending upon the student's prior experience, needs, and career goals.
PR 820	Master's Clerkship-Pharmacology	To gain experience and proficiency in the clinical and/or research applications in pharmacology, students will become familiar with state-of-the-art instrumentation and specialized research techniques in microbiology, immunology and/or molecular biology through placement in a clinical or research laboratory of the University or in an affiliate institution or their place of employment. The type of research laboratory and duration of training for this experience and hence the credit hours, will vary depending upon the student's prior experience, needs, and career goals.
PR 830	Laboratory Clerkship	To gain experience and proficiency in the clinical and/or research applications in pharmacology, students will become familiar with state-of-the-art instrumentation and specialized research techniques in microbiology, immunology and/or molecular biology through placement in a clinical or research laboratory of the University or in an affiliate institution or their place of employment. The type of research laboratory and duration of training for this experience and hence the credit hours, will vary depending upon the student's prior experience, needs, and career goals.
PR 870	Master's Research	Students will gain experience and proficiency in the formulation of research questions, scientific experimentation, analysis of laboratory data, and the writing of a scientific manuscript.
PR 880	Master's Research-PR	Students will gain experience and proficiency in the formulation of research questions, scientific experimentation, analysis of laboratory data, and the writing of a scientific manuscript.

PR 890	Master's Research	Students will gain experience and proficiency in the formulation of research questions, scientific experimentation, analysis of laboratory data, and the writing of a scientific manuscript.
PR 910	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
PR 920	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
PR 930	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
PHARMACOLOGY (JCP)		
PHRM 510	Biochemistry	This biochemistry course describes the chemistry and metabolism of carbohydrates, lipids, and proteins. It also addresses blood clotting and selected topics of the production and degradation of blood cells.
PHRM 511	Biostatistics	This course will provide an understanding of commonly used research methods and statistical tests, the skills needed to manage data sets and evaluate statistical results, and the knowledge necessary to apply the concepts of statistical versus clinical significance to practice. The course is a practical approach to using statistical tests in a research framework. The focus of the course is on enabling students to become consumers of the research literature rather than biostatisticians.
PHRM 512	Preventive Healthcare and Self- Care Issues	This course focuses on disease prevention and wellness promotion through health risk assessment, lifestyle modification, and the use of other nonpharmacologic therapies. It evaluates the role of nonprescription drug therapies and dietary supplements in preventive healthcare and patient self-care.
PHRM 513	Medicinal Chemistry	Medicinal chemistry addresses the physicochemical properties of drug molecules, the chemical basis of pharmacology and therapeutics, fundamental pharmacophores for drugs used to treat disease, structure-activity-relationships (SAR) pertaining to drug-target interactions and chemical pathways of drug metabolism. The main objective of the course is to understand how the chemical structures of drugs determine their biological properties, including absorption, distribution to sites of action, interactions with pharmacological targets, metabolic inactivation, forms and routes of elimination, and therapeutic potential. The course is designed to include basic chemical concepts that govern drug action, general principles of medicinal chemistry, and chemical characteristics of selected drug classes. Students will also gain an understanding of how these principles can be generally applied to making drug therapy decisions. Learning activities in the course consist primarily of lectures, recitations, and problem-solving exercises.

PHRM 514	Pathophysiology I	Provides an understanding of the basic principles and mechanisms of disease, including but not limited to: inflammation and repair; degeneration; hemodynamic disturbances; and developmental defects related to disorders affecting the hematologic, endocrine, cardiovascular, renal, genitourinary, and respiratory systems. This level of understanding will be applied through patient cases to address disease states amenable to pharmacist intervention. In addition, medical terminology will be learned and applied to the course content.
PHRM 515	Pathophysiology II	Provide an understanding of the basic principles and mechanisms of diseases affecting the neurologic, psychiatric, gastrointestinal, musculoskeletal, immunologic, integumentary systems, and hematological and solid organ oncology, through discussion of but not limited to inflammation and repair; degeneration; hemodynamic disturbances; developmental defects; and neoplasia. This level of understanding will be applied through patient cases to address disease states amenable to pharmacist intervention. In addition, medical terminology will be learned and applied to the course content.
PHRM 516	Pharmacy Practice I	Provides an overview of the pharmacy profession and the history of pharmacy as well as discussion surrounding what it means to be a professional (including but not limited to issues of ethics, cultural competency and emotional intelligence). Pharmacy law, as it relates to the IPPE courses, will be introduced to the student. Student participation in the Jefferson Health Mentors Program will be encompassed within this course series.
PHRM 517	Pharmacy Practice II	Provides an overview of the role of the pharmacy profession relative to different areas of practice and in the role as advocate for healthcare. Continued reflection regarding what it means to be a professional will occur. Other social and behavioral aspects of pharmacy will be addressed through class discussions and the Jefferson Health Mentors program and will include patient and other healthcare provider perceptions of pharmacists' capabilities, role of the pharmacist related to patient care, and role of the pharmacist related to interaction with other healthcare providers.
PHRM 519	Healthcare Delivery Systems	Provides an introduction to the U.S. health care delivery system; addresses the social, political, and economic context of U.S. health care, the distribution of medical care and pharmaceutical products and services, as well as the role of public and private insurers, pharmaceutical industry, and managed care organizations on health care delivery in the U.S.
PHRM 520	Molecular and Cell Biology	This molecular and cellular biology course contains instruction on nucleotide metabolism, the classic concept of DNA to RNA to protein, the structure and behavior of cells, and the major modes of inheritance. This course will prepare students for topics that are covered in the Pathophysiology and Clinical Diagnosis/Pharmacotherapy courses.
PHARM 521	Pharmaceutical Calculations	This course will introduce pharmacy students to the calculations commonly used in pharmacy practice. The knowledge and skills learned in this course will prepare students to apply calculation problem solving skills to clinical practice. Topics discussed will focus on the pharmaceutical and clinical calculations that are critical to the safe and effective delivery of medications to the patient.

PHRM 522	Introductory Pharmacy Practice Experience Healthcare Service Learning	<p>The purpose of this course is to foster a sense of community involvement and instill a basic understanding of pharmaceutical care in P1 students through healthcare related service. The course focuses on identifying and addressing human and community needs and will provide students the opportunity to practice basic skills required to provide pharmaceutical care.</p> <p>The course is conducted at service sites in Philadelphia. Healthcare related community service sites include, but are not limited to: wellness centers, homeless shelters, senior centers and clinics for the underserved. Experiences at the site may incorporate knowledge gained and skills and attitudes developed in the P1 didactic coursework, as well as the IPPE II course, depending upon which semester the IPPE I is taken.</p>
PHRM 523	Introductory Pharmacy Practice Experience : Community Pharmacy	<p>The purpose of the course is to instill in a basic understanding of community pharmacy practice through site-based experiences. The course is conducted in outpatient, community pharmacies located in Philadelphia and its surrounding counties. Experience at the site may incorporate knowledge gained and skills and attitudes developed in the P1 didactic coursework, as well as the IPPE I course, depending upon which semester the P1 IPPE II is taken.</p>
PHRM 525	Immunology	<p>Introduces students to the immune system as an adaptive defense system that recognizes invading pathogenic organisms and mounts a response to eliminate or neutralize foreign infectious agents. Additionally, this course introduces students to the immunological basis for auto-immune diseases including allergy, transplantation immunology and tumor immunology. Students will be introduced to the molecules, the cells and organs, and the processes involved in host defense against infection. An overview of basic principles, concepts, and techniques used to assess immune status will be presented that will be necessary for further exploration into related topics in immunology- based pharmacology and therapeutics.</p> <p>Students will also be introduced to the ways in which the adaptive immune system interacts with and depends upon innate defense systems. Further, the ways in which these defense mechanisms can fail will be presented, including failures to combat infection or tumor growth and development of over-reactions to infections, to environmental agents, or to self.</p>
PHRM 526	Physical Assessment & Clinical Skills	<p>Physical assessment and clinical skills provides the student with knowledge of the skills necessary for obtaining a comprehensive patient history and problem identification. Students will learn to design patient-centered, culturally relevant pharmacy care plans and appreciate the role of these plans in patient care. Students will learn basic assessment techniques and the skills necessary for triage and referral. This course will also introduce the role of home diagnostic and monitoring devices in the diagnosis, staging, and monitoring of various disease states.</p>
PHRM 527	Drug Information & Literature Evaluation	<p>Emphasizes the skills needed to develop drug information for dissemination to health care providers. Emphasizes the types of drug information available, what sources are appropriate to use in a variety of situations and the strengths and weaknesses of different sources. Provides the knowledge and skills necessary to evaluate clinical trials that validate treatment usefulness, to apply evidence-based decision making to patient care and develop guidelines.</p> <p>The course provides an overview of how medical information skills are applicable, and necessary, in various settings. Examples include medical information in the pharmaceutical industry, development of evidence-based guidelines, application of informatics to facilitate guideline adherence, key points to secure when responding to a specific question type such as drug use in pregnancy, and newer information sources such as mobile apps and social media.</p>

PHRM 528	Introductory Pharmacy Practice Experience : Hospital Pharmacy	The purpose of the course is to instill a basic understanding of hospital pharmacy practice through site-based experiences. The course is conducted in hospital pharmacy settings located in Philadelphia and its surrounding counties. Experience at the site may incorporate knowledge gained and skills and attitudes developed in the P1 and P2 coursework, as well as in the IPPE I, II and IV experiences; depending upon which semester IPPE III and the above courses are taken.
PHRM 529	Medication Safety	This course will provide students with an understanding of the basic safety principles employed in the medication-use process. These principles include the following: understanding systems thinking; identifying the types and causes of medication errors; developing strategies for improving the medication-use process; and defining the role of medication safety resources and reporting systems.
PHRM 530	Pharmaceutics and Drug Delivery Systems	Pharmaceutics deals with the formulation, preparation, preservation, and dispensing of medications and related therapeutic devices. A successful dosage form or drug delivery system must ensure the effective, reliable, and safe delivery of the drug to its site of action in the body. The course will explore the many physical, chemical, engineering, organoleptic, and esthetic principles involved in dosage form design and preparation. From tablets and capsules to syrups and injectable, the student will gain an in-depth appreciation of the role of dosage form characteristics relative to the route of administration in drug therapy decisions. Learning activities in the course consist of lectures, problem-solving exercises, and quizzes with feedback review.
PHRM 531	Pharmaceutics Laboratory	This course will introduce the student to dosage forms utilized by today's compounding pharmacists and will provide students with an understanding of the prescription and pharmaceutical calculations, including the metric and common systems of measurement, calculation of doses, and various methods of expressing the strength of pharmaceuticals. Upon completion, students should be able to perform correctly the calculations required to prepare a medication order properly. A range of dosage forms will be discussed and prepared, with an emphasis on formulation, preparation and presentation of solid, semi- solid and liquid dosage forms with a specific focus on blends and mixtures (capsules, suppositories, troches, solutions and dispersions; emulsions and suspensions) for oral, rectal, vaginal, topical and transdermal routes of delivery.
PHRM 533	Pharmacy Management: Theory & Applications	This course will enable students to apply management principles (planning, organizing, directing and controlling resources) to various pharmacy practice settings. It provides an introduction to marketing principles, basic accounting principles, project management issues, managing and improving the medication-use process, and topics related to healthcare improvement mechanisms at the micro- and macro-system levels. Through class discussions and group project work, students have the opportunity to research innovative concepts and develop entrepreneurial skill as they create and build justification for the business case for their assigned pharmacy programs. Students are encouraged to investigate current landscape of existing programs and to develop new and innovative approaches to solving current practice setting challenges.
PHRM 534	Pharmacy Practice III	The 3rd course in a 4 course series, Pharmacy Practice III will include continued reflection regarding what it means to be a professional with further discussion and exercises focusing on broad issues including cultural competency and emotional intelligence as well presentations by individuals practicing in a variety of pharmacy environments. Other social and behavioral aspects of pharmacy will be addressed through class discussions and the Jefferson Health Mentors program. The course will provide a continuation of pharmacy current event topics.

PHRM 535	Biopharmaceutics & Principles of Clinical Pharmacokinetics	<p>Biopharmaceutics is the science that examines the interrelationships between physicochemical properties of a drug, the dosage form, specific formulation, and route of administration with the rate and extent of drug absorption into the systemic circulation, distribution, metabolism, and elimination from the body. Pharmacokinetics is the science of the kinetics (rates) of drug absorption, distribution, metabolism, and elimination in an in-vivo system. Dissecting and modeling the interplay among these factors is the purview of biopharmaceutics and pharmacokinetics. The knowledge and algorithms derived from such exercises are routinely applied to facilitate dosage form design, to predict medication dosing regimens, and to optimize treatment protocols for individual patients based on their specific profiles. This course is designed to include key mathematical, physicochemical, and biological principles that govern the fate of a dosage form or its active ingredient as it traverses the many varied barriers between the site of administration, the site of action, and the site and mode of elimination. Learning activities in the course consist primarily of lectures, discussions, and problem-solving exercises or assignments.</p>
PHRM 537	Introductory Pharmacy Practice Experience : Ambulatory Care	<p>The purpose of the course is to instill a basic understanding of ambulatory care pharmacy practice through both site-based and simulated experiences. The course is offered in two individual components. One-half of the course is conducted in ambulatory care settings located in Philadelphia or its surrounding counties. The remaining half of the course is conducted in the Pharmacy Practice Simulation Center. Course experiences may incorporate knowledge gained and skills and attitudes developed in the P1 and P2 didactic coursework, as well as in the IPPE I, II and III experiences; depending upon which semester IPPE IV and the above courses are taken.</p>
PHRM 538	Pharmacy Practice IV	<p>The fourth course in a 4 course series, Pharmacy Practice IV will include continued focus on professional development with further discussion and exercises surrounding bioethics, patient safety, cultural competency and emotional intelligence. Presentations by individuals practicing in a variety of pharmacy environments will continue. Other social and behavioral aspects of pharmacy will be addressed through class discussions and the Jefferson Health Mentors program. Contemporary issues in pharmacy practice will also be discussed and evaluated.</p>
PHRM 539	Pharmacology III	<p>Pharmacology III focuses on drugs effective for the chemotherapy, biological and hormonal therapies for cancer, drugs applicable for the treatment of neurological and psychiatric disorders, and abusable drugs that modulate normal ranges of behavior. The neuropharmacology section begins with a review of the structures and mediators that play key roles in various brain functions, identifies neurochemical opportunities for pharmacologically targeting associated brain dysfunctions, and describes the properties of various classes of agents in current use. The cancer pharmacology section will begin with common classification of anti-cancer agents, followed by introduction of each class of anti-cancer agents. Students will gain an understanding of the mechanisms of therapeutic and adverse actions of drugs.</p>
PHRM 542	Pharmacy Practice Lab I	<p>This course will expand the student's pharmacotherapeutic foundation of knowledge by incorporating active learning experiences and reinforcing skills related to course content covered through Spring of the P2 year. Students will also learn and perform immunization administration and are expected to earn an APhA Pharmacy-Based Immunization Delivery Program certificate. In addition, it will further increase the student's level of experience relative to communication skills and introduce them to new pharmacy skills where applicable.</p>

PHRM 544	Clinical Diagnosis & Pharmacotherapy IV	<p>This is the fourth course in the series that builds upon knowledge and skills that have been acquired in Medicinal Chemistry, Pharmacology I, Pathophysiology I and II, and other basic and clinical science courses. This course will allow the learner to develop and apply critical thinking skills toward the management of patients with infectious diseases. The course is designed to be active learning via case-based discussions. Students will be provided patient cases to work up covering infectious diseases. Students will utilize the instructional resources (e.g. textbook, podcasts, journal articles, guidelines, etc.) to work through the cases prior to class and come prepared to actively engage in the in-class discussion. At the conclusion of this course, the learner will have a firm knowledge base in the diagnosis and clinical management of patients with common infectious diseases.</p>
PHRM 545	Pharmacy Practice Lab II	<p>This course will expand the student's pharmacotherapeutic foundation by incorporating active learning experiences and reinforcing skills related to clinical and physical assessment. In addition, it will further increase the student's level of experience relative to written and verbal communication skills and introduce them to new pharmacy skills where applicable. Students will also learn aseptic technique and perform sterile compounding.</p>
PHRM 546	Clinical Diagnosis and Pharmacotherapy V	<p>This is the fifth course in the series that builds upon knowledge and skills that have been acquired in Medicinal Chemistry, Pharmacology III, Pathophysiology I and II, other basic and clinical science courses, and Clinical Diagnosis/Pharmacotherapy I-IV. This course will allow the learner to develop and apply critical thinking skills toward the management of patients with neurologic and psychiatric disorders. The course is designed to be active learning via case-based discussions. Students will be provided patient cases to work up covering neurologic and psychiatric disorders. Students will utilize the instructional resources (e.g. textbook, journal articles, guidelines, etc.) to work through the cases prior to class and come prepared to actively engage in the in-class discussion. At the conclusion of this course, the learner will have a firm knowledge base in the diagnosis and clinical management of patients with common neurologic and psychiatric disorders.</p>
PHRM 547	Clinical Diagnosis and Pharmacotherapy VI	<p>This is the sixth course in the Clinical Diagnosis/Pharmacotherapy series that builds upon knowledge and skills acquired in Medicinal Chemistry, Pharmacology III, Pathophysiology I and II, and other basic and clinical science courses. This course will allow the learner to develop and apply critical thinking skills toward the management of cancer and other miscellaneous conditions. The course is designed to be active learning via case-based discussions. Students will be provided patient cases to work up covering oncology diseases and other miscellaneous conditions. Students will utilize the instructional resources (e.g. textbook, journal articles, guidelines, etc.) to work through the cases prior to class and come prepared to actively engage in class discussions. At the conclusion of this course, the learner will have a firm knowledge base in the diagnosis, clinical treatment and supportive care management of patients with cancer and other miscellaneous conditions.</p>
PHRM 548	Pharmacy Practice Lab III	<p>This course will expand and reinforce the student's pharmacotherapeutic foundation of knowledge by incorporating active learning experiences and skills related to clinical and physical assessment. In addition, it will further increase the student's level of experience relative to verbal and written communication skills and introduce them to new pharmacy skills where applicable. Students are also expected to complete Comprehensive Medication Management Collaborative training.</p>

PHRM 549	Pharmacology I	<p>Pharmacology I provides an understanding of drug action in the framework of human physiology, biochemistry, and pathophysiology. The main objective of the course is i) to provide an introduction to pharmacodynamic parameters of drug action, drug-receptor interaction, drug toxicity, adverse drug reactions and pharmacogenetics; and ii) to understand the pharmacology related to particular physiological or biochemical systems including the Endocrine system, Immune system, Respiratory system, Gastrointestinal tract in addition to anti-infective drugs. The course is designed to include the pharmacology aspect of each biological system, presentation of drugs and drug classes that activate or inhibit the system by interacting with specific molecular and cellular targets, and discussion of the pathophysiological targets of each system-associated disorder.</p> <p>Students will gain an understanding of the therapeutic and adverse actions of drugs in the framework of the drug's mechanism of action. Learning activities in the course consist primarily of lectures, problem-solving exercises, and in-class assignments.</p>
PHRM 550	Interprofessional Grand Rounds	<p>Students in this interprofessional course evaluate the influence of current social, political, and cultural issues on the United States healthcare system. Topics of discussion vary and include healthcare and team communication, patient safety and error reduction, use of technologies in health care, and end of life care, among others. Students address these issues incorporating aspects that may include but are not limited to principles of professional behavior and ethical issues in delivery of patient-centered care. Students will interact with students from other healthcare professions in online and in-person forums.</p>
PHRM 551	Pharmacoecon & Hlth Outcomes	<p>Covers the science of pharmacoeconomics including design, methods, and analysis; discusses the context and uses of pharmacoeconomic analysis in U.S. healthcare decision making from various perspectives; explains global application of pharmacoeconomics to inform pharmaceutical reimbursement policies and decisions.</p>
PHRM 552	Integrated Practice Applications	<p>This course will serve as the capstone course to the P1 through P3 curriculum. Throughout the semester, students will utilize the knowledge and skills obtained throughout the curriculum to date to perform comprehensive activities. Students will practice a comprehensive approach (clinical, social, administrative) to solving integrated problems and cases throughout the semester with frequent instructor feedback.</p>
PHRM 553	Professional Seminar I	<p>The student will assess, develop, and present an individual presentation focusing on a specific pharmacotherapeutic topic. The course will emphasize critical thinking and effective verbal communication skills and allow students to apply biostatistics and literature evaluation skills.</p>
PHRM 554	Clinical Diagnosis and Pharmacotherapy I	<p>This is the first course in the series that builds upon knowledge and skills that have been acquired in Medicinal Chemistry, Pharmacology I, Pathophysiology I and II, Physical Assessment and Clinical Skills, and other basic and clinical science courses. This course will introduce basic therapeutic principles and allow the learner to develop and apply critical thinking skills toward the management of patients with endocrine disorders. The course is designed to have an active learning focus via case-based discussions. Students will be provided patient cases to work up covering therapeutic principles, and endocrine disorders. Students will utilize the instructional resources (e.g. textbook, journal articles, guidelines, etc.) and come prepared to actively engage in the in-class discussion. At the conclusion of this course, the learner will have a firm knowledge base in basic therapeutic principles, and diagnosis and clinical management of patients with common endocrine disorders.</p>

PHRM 555	Clinical Diagnosis and Pharmacotherapy II	<p>This is the second course in the series that builds upon knowledge and skills that have been acquired in Medicinal Chemistry, Pharmacology I and II, Pathophysiology I and II, and other basic and clinical science courses. This course will allow the learner to develop and apply critical thinking skills toward the management of patients with common renal, gastrointestinal disorders, and immunologic disorders. The course is designed to have an active learning focus via case- based discussions and team-based learning exercises. Students will be provided patient cases to work up and will utilize the instructional resources (e.g. textbook, journal articles, guidelines, etc.) to work through the cases prior to class and come prepared to actively engage in the in-class discussion. At the conclusion of this course, the learner will have a firm knowledge base in the diagnosis and clinical management of patients with renal, gastrointestinal disorders, and immunologic disorders</p>
PHRM 556	Pharmacology II	<p>Pharmacology II will be the second course in this series; it will provide an understanding of drug action in the context of human physiology, biochemistry, and pathophysiology. Pharmacology II will encompass the pharmacology of bacterial and mycobacterial infections, autonomic pharmacology, and cardiovascular pharmacology. Pharmacology of bacterial infections will include cell wall synthesis inhibitors, DNA replication inhibitors, and protein synthesis inhibitors. Autonomic pharmacology will include an overview of the autonomic nervous system (sympathetic and parasympathetic), and adrenergic and cholinergic pharmacology. Cardiovascular pharmacology will include an overview of cardiac, vascular, and renal physiology, as they relate to the control of cardiovascular function, and the mechanisms of action of drugs used to treat cardiovascular disorders. Learning activities in the course consist primarily of lectures, technology-assisted discussions, Nearpod sessions, problem-solving exercises, in-class quizzes and team-based learning (TBL).</p>
PHRM 557	Clinical Diagnosis and Pharmacotherapy III	<p>This is the third course in the series that builds upon knowledge and skills that have been acquired in Medicinal Chemistry, Pharmacology I and II, Pathophysiology I and II, Physical Assessment and Clinical Skills and other basic and clinical science courses. This course will allow the learner to develop and apply critical thinking skills toward the management of patients with cardiovascular and pulmonary disorders. The course is designed to have an active learning focus via case-based discussions. Students will be provided patient cases to work-up covering cardiovascular and pulmonary disorders. Students will utilize the instructional resources (e.g. textbook, journal articles, guidelines, etc.) to work through the cases prior to class and come prepared to actively engage during the in-class discussion. At the conclusion of this course, the learner will have a firm knowledge base in the diagnosis and clinical management of patients with common cardiovascular and pulmonary disorders.</p>
PHRM 558	Introductory Pharmacy Practice Experience: Direct Inpatient Care	<p>The purpose of the course is to instill a basic understanding of direct inpatient care pharmacy practice through site-based experiences. The course is conducted in hospitals located in Philadelphia and its surrounding counties. Experience at the site may incorporate knowledge gained and skills and attitudes developed in the P1 and P2 coursework; as well as the ongoing P3 coursework.</p>
PHRM 559	Introduction to Pharmacy Practice Lab I	<p>This course will introduce students to the application of foundational knowledge and essential skills for pharmacy practice and patient care through active learning experiences related to course content delivered simultaneously in other Fall P1 courses. This includes effective communication, verbally and in writing, to both patients and health care practitioners, as well as the use of the pharmacist's patient care process (PPCP) for self-care conditions.</p>

PHRM 561	Creating Pharmacy Leaders	This course is designed to acquaint the pharmacy student with current pharmacy professionals who are considered to be leaders within the profession. The student will also become familiar with characteristics common amongst leaders.
PHRM 565	Pediatric Pharmacotherapy	This course is designed to expand the student's current knowledge base regarding the pediatric population and to introduce the core concepts involved in the care of special populations. The course is provided to prepare students to identify and address drug related problems in pediatric patients and to demonstrate competency within those areas. In addition, medical terminology will be learned and applied to the course content.
PHRM 568	Introductory Pharmacy Practice Experience: Selective	The purpose of the course is to provide students with an expanded awareness and understanding of potential career opportunities within the pharmacy profession. Through participation in this IPPE, students can explore an area of pharmacy practice in which they have a personal interest.
PHRM 570	Critical Care Pharmacotherapy	The purpose of this course is to introduce students to the field of critical care pharmacy practice. Students will learn how to approach the care of a critically ill patient and will explore topics such as sedation and analgesia, medical emergencies, toxicology, mechanical ventilation and end-of-life care.
PHRM 571	Diabetes Immersion	The purpose of this course is to provide the students with the opportunity to learn in-depth knowledge of diabetes through active, hands-on learning. As a required part of this course, students will participate in a week long experience of living with diabetes in which they will give "insulin" injections and check blood glucose 4 times per day. Students will also have the opportunity to tour a grocery store with a registered dietician, meet patients living with diabetes, and participate in diabetes education to the community.
PHRM 572	Academic Pharmacy	This course will introduce the pharmacy student to the three components of pharmacy academia: teaching, scholarly activity and service. Several weeks of the course will be devoted to each of these three components with the students participating in activities representative of what faculty do relative to each component. The activities will include: the development of a teaching philosophy and a classroom experience; participation in peer evaluation of teaching; and reflection on their personal learning style and strengths relative to academia.
PHRM 574	Pharmacogenomics	This class will provide in depth evaluation of methodologies used in pharmacogenomics and the role of genetics in treating diseases. Through readings, lecture, student presentations and discussion, each class will focus on pharmacogenomics applications in various diseases like cardiac, cancer and diabetes.
PHRM 575	Introduction Nuclear Pharmacy	Introduction to Nuclear Pharmacy course is designed to review basic concepts of radioactive decay, production of radionuclides, radiation detection and measurement. Basic principles applicable to instrumentation, the design of diagnostic imaging drugs, and clinical concepts will be highlighted. Application of radiopharmaceuticals in diagnosis and treatment of diseases will be emphasized. Participants will examine the role of a nuclear pharmacist and understand the regulatory requirements under which they operate. Learning activities in the course will consist of lectures, problem-solving exercises, and a visit to a Nuclear Pharmacy.
PHRM 576	Introduction to Community Pharmacy Practice	The Introduction to Community Pharmacy Practice Elective will provide in-depth discussions of the workings of community pharmacy. Emphasis will be on developing and/or enhancing the skill set needed to handle the dynamic issues facing community pharmacists. The course is designed to facilitate the transition from student to registered pharmacist in a community pharmacy setting.

PHRM 577	Drug Discovery	This course focuses on understanding the process that leads to discovering new drugs. The course covers an understanding of FDA and introduction to various pre-clinical and clinical studies and steps for the FDA approval process. The class will cover an understanding of the drugs that are in different phases of drug development process for many diseases. The course will be an in depth study of the current concepts and literature on specific areas in drug discovery.
PHRM 580	Advanced Drug Metabolism	This course focuses on understanding the process that leads to discovering new drugs. The course covers an understanding of FDA and introduction to various pre-clinical and clinical studies and steps for the FDA approval process. The class will cover an understanding of the drugs that are in different phases of drug development process for many diseases. The course will be an in depth study of the current concepts and literature on specific areas in drug discovery.
PHRM 581	Pharmaceutical and Biotechnology Drug Development	This course focuses on understanding the technologies that required for the development, production, and manufacture of biological drugs. This class will introduce students to the molecular principles, methods and advanced developmental techniques utilized in the production of therapeutic proteins, hormones, antibodies, and DNA based vaccines. Pharmaceutical delivery methods with an emphasis on controlled release formulations will also be focused in this course. The roles of economic considerations, regulatory issues and the approval of biopharmaceuticals will also be incorporated throughout the course as applicable.
PHRM 584	Student Pharmacist Enrichment 1	The Student Pharmacist Enrichment Program (SPEP) provides the student pharmacist with an opportunity to expand their perspective in awareness of self and others, innovation, professionalism, and service. Students are encouraged to select personal development activities based on self-assessment of the seven co-curricular elements.
PHRM 585	Student Pharmacist Enrichment 2	The Student Pharmacist Enrichment Program (SPEP) provides the student pharmacist with an opportunity to expand their perspective in awareness of self and others, innovation, professionalism, and service. Students will identify a personal plan to meet the expectations of the SPEP program based on self-assessment.
PHRM 586	Student Pharmacist Enrichment 3	The Student Pharmacist Enrichment Program (SPEP) provides the student pharmacist with an opportunity to expand their perspective in awareness of self and others, innovation, professionalism, and service. Students will document self-selected activities in the seven co-curricular elements, accounting for personal plan and expectations of the SPEP program.
PHRM 587	Student Pharmacist Enrichment 4	The Student Pharmacist Enrichment Program (SPEP) provides the student pharmacist with an opportunity to expand their perspective in awareness of self and others, innovation, professionalism, and service. Students will reflect upon their growth within the seven co-curricular elements after four years within SPEP.
PHRM 589	Pharmacy Board Review	The Board Review Course is a longitudinal course that coincides with the P4 APPEs. Orientation to this course is held in the fall semester with students completing required, assigned cumulative exams that are part of the RxPrep Board Review Course as they progress through the remainder of their APPE rotations. At the conclusion of the spring semester, all students are required to attend the in-person 3-day review course. This longitudinal course aids in the student's preparation for the NAPLEX following graduation.

PHRM 590	Personal Finance for Young Professionals	Pharmacy graduates are burdened with high student loan debt and may have limited financial literacy. This course aims to provide students with the tools and resources to promote financial self-education, manage debt, save for retirement, and protect against risk. This course will provide the young professional an understanding of personal finance, including topics such as: income taxes, insurance, retirement, investing, estate planning, and student loans.
PHRM 591	Medicinal Cannabis	This course provides a foundation level of knowledge on the topic of medical marijuana. The course will describe the history of Marijuana use in the United States, the pharmacology of the different types of cannabinoids, terpenes and flavonoids, receptor binding, and the medicinal and recreational uses of cannabis in the US. Major emphasis will be given to FDA approved synthetic products and natural cannabinoids for different pathological conditions. Information on the formulation, delivery, and modes of administration of cannabinoids will also be incorporated in the course. Comparison of Marijuana certification requirements for pharmacies in different states will also be discussed.
PHRM 599	Independent Study	This course consists of one on one work between a JSP student and faculty member. The faculty member and student mutually develop the goals, objectives and assessments for the completion of the course. Depending upon the workload agreed to, credits may range from 1-3 per semester.
PHRM 610	Pharmacy Law	This online course provides a comprehensive overview of pharmacy law, with a special focus on the laws and regulations affecting the day-to-day practice of pharmacy. This course will not only allow the learner to understand the interrelationship of federal and state laws and regulations affecting the practice of pharmacy, but also permit the learner to apply this knowledge in being able to research legal issues as they occur in daily practice. The course will also facilitate the development and application of problem-solving skills based on scenario-based pharmacy management issues presented during class. This course will cover in depth the 2 main laws and related regulations affecting the practice of pharmacy, namely the Food Drug and Cosmetic Act and the Controlled Substance Act. The course will also provide a solid understanding of the Pennsylvania Pharmacy Act and Pharmacy regulations (Title 49, Chapter 27; Title 28, Chapter 25). The course will also cover relevant aspects of Omnibus Budget and Reconciliation Act (OBRA 90), Health Insurance Portability & Accountability Act (HIPAA), and malpractice liability. Finally, the course will emphasize an understanding of the MPJE® competency statements and their respective role as the framework for the MPJE® examination.
PHRM 630	Advanced Pharmacy Practice Experience: Community Pharmacy	The purpose of the course is to provide students with the opportunity to apply, reinforce, and advance the knowledge, skills, attitudes, and values developed throughout the P1, P2, and P3 curriculum. The course is conducted in community pharmacies. Emphasis is placed on the student's ability to recall and apply knowledge and skills applicable to the community pharmacy practice environment and to demonstrate attitudes and values expected of pharmacists in this environment. The accurate and safe interpretation, processing, and dispensing of prescriptions including the resolution of any problems and the provision of patient education comprises a major component of this course. Key activities include those detailed in the Pharmacists' Patient Care Process; notably, processing and dispensing prescriptions (plan and implement) in compliance with applicable laws and regulations, interviewing (collect) and educating (implement) patients, monitoring adherence and response to prescribed medication (follow-up), advising patients on the use of over-the-counter products (collect, assess, implement), complementary medication, and healthy lifestyle choices (implement).

PHRM 640	Advanced Pharmacy Practice Experience: Hospital Pharmacy	<p>The purpose of the course is to provide students with the opportunity to demonstrate their ability to reinforce, apply, and advance the knowledge, skills, attitudes and values developed throughout the P1, P2, and P3 curriculum. The course is coordinated within hospital pharmacies. Emphasis is placed on the student's ability to effectively participate in a broad spectrum of activities encompassed within the job responsibilities of contemporary hospital pharmacists. Key activities include those detailed within the Pharmacists' Patient Care Process; notably, medication order processing, safe medication storage and distribution, medication safety, responding to requests for information about medications, and participating in inter- professional decision-making processes.</p>
PHRM 650	Advanced Pharmacy Practice Experience: Ambulatory Care	<p>The purpose of the course is to provide students with the opportunity to apply, reinforce and advance the knowledge, skills, attitudes, and values developed throughout the P1, P2, and P3 curriculum. The course is conducted in ambulatory care and transitional care facilities.</p> <p>Emphasis is placed on the student's ability to recall and apply knowledge and skills applicable to the ambulatory care practice environment and to demonstrate attitudes and values expected of pharmacists in this environment. Management of chronic medical conditions that are treated pharmacologically account for a major component of disease states seen. Key activities include those detailed within the Pharmacists' Patient Care Process; notably, interviewing patients (collect), performing basic physical assessment (collect), monitoring patient response to prescribed medication (assess/evaluate), developing evidence-based pharmacy care plans (plan), educating patients (implement), participating in the inter-professional decision-making process (plan/implement/evaluate), and responding to requests for drug information.</p>
PHRM 660	Advanced Pharmacy Practice Experience: Direct Inpatient Care	<p>The purpose of the course is to provide students with the opportunity to apply, reinforce and advance the knowledge, skills, attitudes and values developed throughout the P1, P2, and P3 curriculum. The course is conducted in patient care areas of hospitals. Emphasis is placed on the student's ability to recall and apply knowledge and skills needed to effectively participate in the patient care decision-making process, functioning as an integral member of an inter- professional, inpatient healthcare team. The most commonly encountered medical conditions include cardiovascular disorders, diabetes, infectious diseases, pulmonary disorders, and renal and hepatic dysfunction. Key activities include those detailed within the Pharmacists' Patient Care Process (PPCP); notably, retrieval (collect) and assessment (plan/interpret) of pertinent information contained within patients' medical records, development (plan/implement) and monitoring (evaluating/follow-up) of pharmaceutical care plans, participating in the inter- professional decision-making process (plan/implement), and providing drug information.</p>
PHRM 670	Advanced Pharmacy Practice Experience: Direct Patient Care	<p>The purpose of the course is to provide students with the opportunity to apply, reinforce and advance the knowledge, skills, attitudes and values developed throughout the P1, P2, and P3 curriculum. The course is conducted in patient care settings. Common types of sites include, but are not limited to: acute (inpatient) care, ambulatory care, community pharmacies, compounding and specialty pharmacies, and transitional care and rehabilitation facilities. Emphasis is placed on the student's ability to effectively participate in the patient care decision making process, functioning as an integral member of an inter-professional healthcare team. The most commonly encountered pharmacist responsibilities and the common medical conditions will be dependent upon the nature of the patient care site. Key activities include those detailed in the Pharmacists' Patient Care Process (PPCP); notably, collection, assessment, and maintenance of pertinent patient information, development and monitoring of care plans, accurate preparation and dispensing of medications to patients or caregivers, participating in the inter-professional decision-making process, and responding to requests for drug information.</p>
PHYSICAL THERAPY		

PT 506	Biomechanics and Kinesiology	The purpose of this course is to examine the principles of human motion based on anatomy, physiology, physics and mechanics. Students will examine the static and dynamic relationship between structure and function of the neuro-musculoskeletal system under normal and abnormal conditions. Topics include basic biomechanical principles, tissue response to biomechanical forces, muscle and joint mechanics, and kinetic and kinematic concepts of motion analysis as they apply to a specific joint region and/or whole body movement patterns. Changes throughout the lifespan as they apply to biomechanics and kinesiology will be introduced. The laboratory portion of this course includes participation in both qualitative and quantitative movement analyses at each joint complex and of the entire body during functional activities and gait. Students will also develop and improve problem solving and clinical decision-making skills through application of kinesiological and biomechanical principles to case studies.
PT 507	Advanced Human Anatomy	This is an advanced human anatomy course. Students will develop a thorough foundation in human gross anatomy through lectures and laboratory dissection experiences. Basic imaging modalities such as CT, MRI and radiographic films will be used to further enhance students' knowledge of human anatomy.
PT 513	Pathophysiology I	This three-credit course is the first of a two-course sequence that presents an overview of the clinical pathophysiology of disorders frequently encountered by physical therapists. Concepts associated with pathophysiology are introduced and the relationship between pathological processes and body structure and function, physical activity, and participation is emphasized according to the International Classification of Function (ICF) model. Basic medical management of the conditions presented including diagnostic tests, lab values, and common medical interventions are discussed as related to physical therapy. This course is structured to integrate physiologic principles with pathologic processes and clinical cases are discussed to reinforce the relevance to physical therapy practice. Specifically, disorders of the cardiovascular, pulmonary, and musculoskeletal systems are discussed.
PT 514	Pathophysiology II	This three credit course is the second of a two-course sequence that presents an overview of the clinical pathophysiology of disorders frequently encountered by physical therapists. Concepts associated with pathophysiology are introduced and the relationship between pathological processes and body structure and function, physical activity, and participation is emphasized according to the International Classification of Function (ICF) model. Basic medical management of the conditions presented including diagnostic tests, lab values, and common medical interventions are discussed as related to physical therapy. This course is structured to integrate physiologic principles with pathologic processes and clinical cases are discussed to reinforce the relevance to physical therapy practice. Specifically, neuromuscular, oncologic, immune, endocrine, gastrointestinal, hepatic, and renal disorders, and infectious diseases, are discussed.
PT 516	Neuroscience	A study of the basic principles and concepts related to the nervous system. Emphasis is placed on the role of the nervous system in normal physiologic function, with particular emphasis on sensorimotor behavior. Neuroanatomy, neurophysiology, and an introduction to neuropathology are included.
PT 518	Movement System	The movement system is the term used to represent the collection of systems (cardiovascular, pulmonary, endocrine, integumentary, nervous and musculoskeletal) that interact to move the body or its component parts. This course is a study of the basic principles and concepts related to human movement science. The development and changes the individual experiences across the life span provides the foundation for understanding human movement. Emphasis is placed on the role of multiple systems in movement, with particular emphasis on sensorimotor behavior inclusive of motor development, motor learning and motor control theory. The course will focus on the systematic evaluation of movement behavior and the possible impairments that can impact individuals' ability to move in the context of function and performance.

PT 527	Critical Inquiry I	This course is designed to present quantitative and qualitative research design and statistical analysis with the intent to assist the student in critically evaluating the primary literature and applying the principles of measurement consistent with the Patient/Client Management Model. Common research methods and designs are discussed and applied to clinical problems. Quantitative and qualitative statistical analyses will be reviewed with the goal of comprehension and interpretation. Quantitative, qualitative, and mixed methods designs will be compared and contrasted, with the goal of developing an appreciation of comprehensive and clinically meaningful research.
PT 533	Introduction to Physical Therapy Examination	This foundational course introduces the student to clinical examination techniques, tests and measures. Course content will build a foundation for future course work. The patient/client management model of the APTA's Guide to Physical Therapist Practice and the World Health Organization's International Classification of Functioning, Disability and Health (ICF) model will be used to frame clinical decision making in employment of appropriate Physical Therapy test and measures. Students will develop and improve problem solving skills and clinical decision-making skills through performance of tests and measures by applying them to case studies and standardized patients. This course also focuses on verbal, nonverbal and written communication for professional interactions with patients, caregivers and other health care providers. Written documentation will build on terminology in the ICF and patient/client management.
PT 534	PT Practice Issues: Introduction to the Physical Therapy Profession	PT Practice Issues is a series of one credit courses that introduces students to various aspects of physical therapist practice. This course focuses on the evolution of physical therapy as a profession, its history, standards of the profession, the APTA Core Values of Professionalism, the Guide to Physical Therapist Practice and APTA Code of Ethics. The student is provided with a historical perspective of professionalism and the maturation of physical therapy as a doctoring profession, reflected in APTA and state practice guidelines.
PT 536	PT Practice Issues: Language of Practice I (Online)	PT Practice Issues is a series of one credit courses that introduces students to various aspects of physical therapist practice. This course focuses on medical terminology, an essential foundation in communication of physical therapists. Using a body systems approach students will learn the building blocks of prefixes, suffixes, roots, combining forms and abbreviations. Through self-directed learning students will define, interpret, and pronounce medical terms related to structure and function, pathology, movement, examination, diagnosis, prognosis, intervention and clinical procedures.
PT 538	PT Practice Issues: Psychosocial Aspects of Physical Therapy & Physical Therapists as Teachers and Learners	This course focuses on managing individual needs during illness and disease as well as ways to successfully interact with and enhance wellness of patients and families in health care settings. A variety of topics will be presented through readings, lectures, discussions and experiential activities. Topics include: a person's needs during disability and acute as well as chronic illness, mind-body relationship, complementary and alternative medicine, and death and dying. This course will also focus on the physical therapist as a teacher and learner in various contexts highlighting roles in the clinic and community and the patient's role in effecting health behavior change.
PT 539	PT Practice Issues: Clinical Decision Making	case studies, students will be presented with diagnoses across four systems: cardiopulmonary, integumentary, musculoskeletal, and neuromuscular. Students will apply clinical decision-making models to address clinical dilemmas in simple case scenarios. Students will also explore use of self-assessment and reflection throughout the clinical decision-making process. Students will be introduced to the documentation used in physical therapy practice and apply the various types of documentation to basic patient cases.

PT 553	Biophysical Agents	This course introduces the use of biophysical agents such as superficial heat, cold, ultrasound, intermittent compression, shortwave diathermy, laser, mechanical modalities, massage and electrotherapy techniques in the management of patients with impairments, functional limitations, activity limitations and participation restrictions. The course will stress a clinical decision-making approach for the selection and application of appropriate biophysical agents within the patient/client management model. Throughout the course evidence supporting the optimal use of biophysical agents will be discussed.
PT 545	Integrated Clinical Experience (ICE)	The Integrated Clinical Experiences (ICE) are goal oriented, diverse active learning experiences that are embedded within the curriculum over a three-course series. The ICE courses are designed to complement classroom learning with concurrent clinical practice. These early clinical experiences allow the student to become socialized in the role of a physical therapist and to practice clinical skills as they are being learned. The focus of this initial ICE course is on the foundation of clinical practice, with emphasis on concurrent classroom/laboratory content. Students will have the opportunity to apply recently learned knowledge and skills learned and assessed through concurrent courses (PT 533 Introduction to Physical Therapy Examination; PT 538 PT Practice Issues: Psychosocial Aspects of PT & PTs as Teachers and Learners; PT 539 PT Practice Issues: Clinical Decision Making) in a clinical environment with actual patients through observation. Each student will be required to complete ICE sessions at an assigned clinical site. The student will also be required to attend an ICE orientation session and ICE reflection sessions.
PT 546	Integrated Clinical Experience (ICE) II	The Integrated Clinical Experiences (ICE) are goal oriented, diverse active learning experiences that are embedded within the curriculum over a three-course series. The ICE courses are designed to complement classroom learning with concurrent clinical practice. These early clinical experiences allow the student to become socialized in the role of a physical therapist and to practice clinical skills as they are being learned. The focus of this second ICE course will be to continue to build on the foundation of clinical practice, with emphasis on previous coursework from prior semesters of DPT 1 and concurrent classroom/laboratory content. Students will have the opportunity to begin to demonstrate learned knowledge and basic skills in a clinical environment by providing hands-on care under the supervision of a licensed physical therapist. Each student will be required to complete ICE sessions at an assigned clinical site. The student will also be required to attend an ICE orientation session and ICE reflection sessions.
PT 556	Therapeutic Interventions	This course will focus on developing therapeutic interventions based the foundational principles of therapeutic exercise. Students will learn to develop physical therapy plans of care to: (1) remediate or prevent impairments, (2) enhance function, (3) reduce risk, (4) optimize overall health, and (5) enhance fitness and well-being. Students will apply clinical decision making models to address interventions to meet patient/client goals and meet desired outcomes. The ultimate goal of the course is to prepare students in this foundational knowledge and skill so they are able to develop and deliver comprehensive plans of care across the lifespan.
PT 607	Musculoskeletal PT I	This is part I of a 3-course series in musculoskeletal physical therapy. Learners will begin to build a foundation in orthopaedic examination and intervention based on the elements of patient/client management (Guide to Physical Therapist Practice) for the lower limb. Patient cases will be used to teach the learner about physical therapy management of musculoskeletal conditions across the continuum of care and throughout the lifespan. Learners will be introduced to musculoskeletal differential diagnosis, regional interdependence, and will utilize clinical decision making in patient scenarios. Management of the patient/client will be related to principles of tissue healing, impairments, and knowledge of pathology and pathomechanics.

PT 608	Musculoskeletal PT II	This is part II of a 3-course series in musculoskeletal physical therapy. Learners will apply and build on their foundation in course I as they learn examination and intervention techniques for the cervical spine, temporomandibular joint, thoracic spine, lumbar spine, sacral iliac joint, and pelvic floor. Patient cases will be used to teach the learner about physical therapy management of musculoskeletal conditions across the continuum of care and throughout the lifespan. Clinical decision making and regional interdependence are emphasized in all patient scenarios.
PT 609	Musculoskeletal PT III	This is part III of a 3-course series in musculoskeletal physical therapy. Learners synthesize information from the first two courses in the series as they learn examination and intervention techniques for the upper limb. The course also includes modules on management of sports injuries along the continuum of recovery. Learners will integrate content learned in previous courses with current course content to devise rehabilitation programs for the injured athletes. Clinical decision making and regional interdependence are emphasized in all patient case scenarios.
PT 611	Cardiovascular and Pulmonary Physical Therapy	This two credit course is the first of two-course sequence that instructs students in the area of cardiovascular and pulmonary physical therapy. Students are instructed in the examination, evaluation, intervention, and outcome assessment of the cardiovascular and pulmonary systems as related to physical therapy. Particular attention is focused on exercise prescriptions, education, and patient management for individuals with cardiovascular and/or pulmonary impairments in various clinical settings. Students will use evidence based concepts to guide decisions for developing a physical therapy plan of care in the areas of cardiac and pulmonary rehabilitation.
PT 612	Cardiovascular and Pulmonary Physical Therapy	This three credit course is the second of a two-course sequence that instructs students in the area of cardiovascular and pulmonary physical therapy. Specifically, this course instructs students in advanced topics including dysrhythmia interpretation, acute and intensive care rehabilitation, mechanical ventilation, and the rehabilitation of medical complex patients. Through a combination of in-class lectures, lab activities, and simulation experiences, students apply clinical decision making models within complex medical scenarios using the ICF Framework.
PT 613	Pharmacology	Students are provided with an overview of drug classifications, the physiologic basis for their actions, and an examination of the synergistic and/or adverse effects to patients' rehabilitation goals.
PT 621	Neuromuscular Physical Therapy I	This is the first of two courses focusing on the physical therapy examination and intervention of patients/clients with neuromuscular dysfunction. Students will learn key skills as part of the examination, evaluation, diagnosis, prognosis, and intervention process to improve overall function, activity and participation of their clients with stroke, spinal cord injury, and cerebellar dysfunction. Environmental and personal factors will be taken into account.
PT 622	Neuromuscular Physical Therapy II	This is the second of two courses focusing on the physical therapy examination and intervention of patients/clients with neuromuscular dysfunction. Students will learn key skills as part of the examination, evaluation, diagnosis, prognosis, and intervention process to improve overall function, activity and participation of their clients with Parkinson's disease, traumatic brain injury, vestibular dysfunction, multiple sclerosis, amyotrophic lateral sclerosis, and a number of other specially chosen neurologic diagnostic categories. Environmental and personal factors will be taken into account.

PT 624	Critical Inquiry II	This course introduces the process and implementation of critical inquiry as an important component of effective Physical Therapy practice. Students learn how to use the breadth of evidence in practice, methods for searching the literature, principles of measurement, uses and usefulness of results as presented in published studies, and the creation of a personal library of critically appraised topics. A journal club format will be used to orient the students to the process of evaluation and synthesis of research results into practice.
PT 628	Capstone Project I	This is the first course in a three course sequence. Students will work in collaboration with faculty to complete a capstone project to meet program requirements for graduation. Students will develop a contract and initiate a project within the categories of clinical practice, teaching, scholarship or administration. This phase of the capstone project includes development of the capstone question, completion of a comprehensive literature review, and a draft of the methodology.
PT 632	Health Care Delivery Systems	This course is designed to advance physical therapy practice by synthesizing knowledge about health care as an established social institution. Emphasis will be on an examination of the evolving health care delivery systems and issues/trends associated with health care and the implications of these will be introduced. Students will explore and participate in the legislative process as advocates for comprehensive and efficacious access and delivery of health care services. Students will also become familiar with principles and concepts related to global health as well as how to utilize evidence-based practice and professional organizations to advocate for population health and wellness.
PT 645	Integrated Clinical Experience (ICE) III	The Integrated Clinical Experiences (ICE) are goal oriented, diverse active learning experiences that are embedded within the curriculum over a three-course series. The ICE courses are designed to complement classroom learning with concurrent clinical practice. These early clinical experiences allow the student to become socialized in the role of a physical therapist and to practice clinical skills as they are being learned. The focus of this final ICE course will be to continue to build on the foundation of clinical practice, with emphasis on previous coursework from prior semesters of DPT 1 and concurrent classroom/laboratory content in DPT 2 semesters. Students will have the opportunity to begin to demonstrate learned knowledge and basic skills in a community-based setting by providing hands-on care to underserved patient populations with limited resources under the supervision of a licensed physical therapist. Each student will be required to complete ICE sessions at an assigned community-based site. The student will also be required to attend an ICE orientation session and ICE reflection sessions.
PT 661	Physical Therapy for the Integumentary System	The integumentary system is an integral part of neuromuscular, musculoskeletal and cardiopulmonary practice. Because of this widespread influence, physical therapists should be well informed regarding how the integumentary system fits into all phases of practice. This course is structured to provide the student with basic knowledge of the integumentary system, what to examine and how to intervene when pathology is present. Selected modalities are reviewed and discussed as specific interventions for the integumentary system. The content is primarily delivered in lecture format and analysis of selected cases presented to the student. Common pathologic integumentary conditions are presented in relation to other musculoskeletal, neuromuscular, and cardiovascular pathologies. Students are also exposed to common skin conditions and cancer.
PT 670	Prosthetic and Orthotic Intervention	This course examines the application of prosthetic and orthotic components including alignment, fabrication, and fitting, gait analysis and exercise programs. Students are facilitated to integrate new information with previous knowledge to enable them to select appropriate examination tests and measures, evaluate, diagnose, prognosticate, create functional goals, and create a comprehensive plan of care for clients who use a prosthesis or orthosis.

PT 674	Pediatric Physical Therapy Practice	This course is an introductory course in the physical therapy management of pediatric patients. The overall frameworks used in this course are the patient/client management model of the APTA's Guide to Physical Therapist Practice and the World Health Organization's International Classification of Functioning, Disability and Health (ICF) model which emphasizes activity and participation based on individualized and family-centered care. The course includes pediatric examination, assessment, evaluation, and intervention for children with cardiovascular, pulmonary, integumentary, musculoskeletal, and neuromuscular dysfunctions as well as children in special settings. Intervention includes direct attention to the child with education to the family to improve function, participation while focusing on health, wellness, and prevention. The student will be able to provide services to children in a manner consistent with family-centered care that is respectful of cultural diversity, occurs in the natural environment when appropriate, and fosters collaborative partnerships.
PT 680	Introduction to Clinical Education	This course is designed to prepare students for full-time clinical education experiences through the clinical education program at Thomas Jefferson University. Students will use the foundation and building blocks obtained in PT coursework and Integrated Clinical Experiences to apply elements of ethical patient/client management, communication and professionalism to the full-time clinical environment. This course will introduce students to clinical education documents, assessment tools and the clinical education electronic database.
PT 682	Clinical Education I	This is the first full time clinical experience. It provides the student the opportunity to work under the direction of a licensed physical therapist to master the advanced beginner skills in the foundations of physical therapy practice. This experience takes place during the academic year and serves to integrate the academic and clinical coursework of the curriculum and advance the skills gained in the first clinical experience.
PT 700	Differential Diagnosis	With most states allowing clients to directly access physical therapy (PT) without a physician referral, therapists must be able to identify signs and symptoms of disease that can mimic neuromuscular or musculoskeletal dysfunction. Given a clinical environment in which therapists are frequently expected to assume the role of autonomous practitioner, this course seeks to aid integration of didactic knowledge, clinical problem solving, and the intuitive process into a scheme useful in the formation of a PT clinical diagnosis and intervention program. This course focuses on the differential diagnostic process within physical therapy and screening for the presence of medical disease or other pathologies whose treatment is beyond the scope of physical therapist practice. Emphasis is placed on the use of problem-solving and clinical decision-making for the process of determining when it is most appropriate to: 1) implement physical therapy care, 2) consult with other healthcare providers regarding patient care while implementing PT, or 3) refer the patient to another healthcare provider.
PT 705	Comprehensive Case Analysis I	This course is the first course in a two course sequence. This course integrates knowledge obtained throughout the curriculum across the 4 physical therapy systems: Musculoskeletal, Neuromuscular, Cardiovascular/Pulmonary, and Integumentary. Complex patient cases will each have a primary diagnosis in one of the systems and secondary diagnoses in at least one other system. Students will learn how to identify priorities for patient management using complex cases. Clinical decision making models will be used to guide evaluation and intervention. Students will engage in simulated and clinical experiences to apply their clinical decision making skills.

PT 707	Comprehensive Case Analysis II	This is the second of a two course series that will apply the science of clinical reasoning in health care and physical therapy while integrating clinical decision-making and evidence-based practice to analyze a real-life, complex patient case in great depth. Clinical decision making models will be used to guide examination, evaluation, intervention and plan of care decisions. Guided reflection activities will focus on crucial elements of student clinical reasoning to prioritize elements of patient management while incorporating practice management issues related to lifespan development, cultural competence, ethics, and reimbursement. Attributes of advanced clinical practice will be discussed with a focus on transitioning from student physical therapist to entry-level practitioner and beyond. Faculty advisors will serve as mentors for students to facilitate professional development and promoting readiness for physical therapy practice.
PT 710	Capstone Project II	In this second course of this three-course sequence, students continue to work in collaboration with faculty to complete a capstone project to meet program requirements for graduation. Students will continue to develop or revise a contract to reflect the agreed upon (and evolving) scope of the project within the categories of clinical practice, teaching, scholarship, or administration. In this phase of the capstone project, students will engage in data collection and/or implementation of the defined activity, data analysis, and assessment of intended research aims and/or outcomes. Students will complete a draft of a scholarly manuscript or project summary.
PT 711	Capstone Project III	In this final course in this three-course sequence, students complete their capstone project in collaboration with faculty. Students will continue, develop or revise a contract to reflect the agreed upon (and evolving) scope of the project within the categories of clinical practice, teaching, scholarship or administration. In this final phase of the capstone project students will make final revisions to the capstone paper, complete a scholarly abstract summarizing project including findings and clinical recommendations as well as prepare and deliver a presentation of their capstone project in the format expected at a professional peer reviewed meeting or scholarly educational session as appropriate for the project.
PT 736	Business and Leadership in Physical Therapy Practice	This course provides an introduction to the organization and management of health care providers and programs from the perspective of the patient/client management model (Guide to Physical Therapist Practice) and consistent with the principles of Leadership, Administration, Management and Professionalism (LAMP) advocated by the American Physical Therapy Association. The role and expectations for management and leadership in the management of care delivery, practice management, consultation and social responsibility and advocacy will be explored. The internal and external environmental/ political/industry forces which drive the delivery of health care today will be discussed. Students will explore their own leadership style within the context of these principles.
PT 774	Geriatric Physical Therapy Practice	This course begins to prepare physical therapy students in the essential competencies in the care of older adults as recommended by the Academy of Geriatric Physical Therapy. The first part of the semester focuses on health promotion and safety and the evaluation and assessment of the older adult. The second part of the semester includes care planning, coordination of care, and the healthcare systems and benefits. The role of physical therapist as advocate and part of an interprofessional team will be threaded throughout the course.
PT 781	Clinical Education II	This is the second full time clinical experience and provides the student with the opportunity to work under the direction of a licensed physical therapist to master the advanced intermediate to entry level skills in the foundations of physical therapy practice for the assigned clinical setting. This experience takes place during the academic year and serves to integrate the academic and clinical coursework of the curriculum and build upon the skills gained in the integrated clinical experiences and the first clinical experience.

PT 782	Clinical Education III	This is the third full time clinical experience and provides the student the opportunity to work under the direction of a licensed physical therapist to master entry level skills in the foundations of physical therapy practice for the assigned clinical setting. This experience takes place during the academic year and serves to integrate the academic and clinical coursework of the curriculum and advance the skills gained in the integrated clinical experiences, first and second clinical experiences.
PHYSICIAN ASSISTANT		
PAST 500	Advanced Human Anatomy	Advanced Human Anatomy is designed to introduce the student to the gross structure of the human cadaver. The material is divided into the following regions: back, hip, gluteal region, leg, thorax, abdomen, pelvis, upper extremity, lower extremity, neck, and the head. The major visceral structures of each region are described in lecture and examined during dissection. The visceral relationships in each region are emphasized. The musculoskeletal system, the peripheral nervous system and their important functional interrelationships are described in lecture and studied via dissection. The course will incorporate core textbook readings, didactic lectures by the faculty of the Department of Anatomy, audiovisual demonstrations, on-line discussions and laboratory dissection of human cadavers that will be performed in small groups.
PAST 510	Patient Communication	This course is designed to instruct students in the basic skills of patient interaction. Students will learn how to perform a complete medical history and provide patient education with a focus on health promotion. This course will include lectures and small group seminars in which students will practice and evaluate their communication skills.
PAST 511	Physical Diagnosis I	This course is the first of a series of three designed to prepare the Physician Assistant student to perform comprehensive physical examinations, with special sensitivity to gender, age and cultural background. The course will focus primarily on the adult patient, progressing through the examination of each of the body systems in a sequential manner in conjunction with Pathophysiology I, Clinical Skills I, Pharmacology I, and Clinical Medicine I. Lectures will emphasize didactic instruction in the following areas, examination skills, normal findings, normal variants, and abnormal findings of the specific areas: vital signs, skin, ear, nose, throat, eye, neck, and thyroid. An emphasis will be placed on the understanding of the relationship of major signs and symptoms to their physiologic or pathophysiologic origins. Live demonstration and videos will be utilized to enhance the lectures. The laboratory will allow students to practice their history taking and physical examination skills in small groups facilitated by faculty members.
PAST 512	Physical Diagnosis II	This course is the second of a series of three designed to prepare the Physician Assistant student to perform physical examinations, with special sensitivity to gender, age and cultural background. The course will focus primarily on the adult patient, progressing through the examination of each of the body systems sequentially in conjunction with Pathophysiology II, Clinical Skills II, Pharmacology II, Clinical Medicine II, and Clinical Medicine III. Lectures will emphasize didactic instruction in examination skills, normal findings, normal variants, and abnormal findings of the specific areas: abdomen, musculoskeletal, respiratory, and cardiovascular systems. An emphasis will be placed on the understanding of the relationship of significant signs and symptoms to their physiologic or pathophysiologic origins. Live demonstration and videos will be utilized to enhance the lectures. The laboratory will allow students to practice their history taking and physical examination skills in small groups facilitated by faculty members.

PAST 513	Physical Diagnosis III	<p>This course is the third of a series of three designed to prepare the Physician Assistant student to perform physical examinations, with special sensitivity to gender, age and cultural background. The course will focus primarily on the adult patient, progressing through the examination of each of the body systems sequentially in conjunction with Pathophysiology III, Clinical Skills III, Pharmacology III, and Clinical Medicine IV. Lectures will emphasize didactic instruction in examination skills, normal findings, normal variants, and abnormal findings of the specific areas: male and female genitourinary, breast, and neurologic systems. An emphasis will be placed on the understanding of the relationship of significant signs and symptoms to their physiologic or pathophysiologic origins. Live demonstration and videos will be utilized to enhance the lectures. The laboratory will allow students to practice their history taking and physical examination skills in small groups facilitated by faculty members.</p>
PAST 520	Intro to Professional Practice	<p>This is an introductory course examining health care related issues in today's society. It begins with a review of the history and evolution of the Physician Assistant profession in US medicine and globally. Topics to be discussed are the status, trends and characteristics of the Physician Assistant as health care providers, their education, regulation, practice patterns, external relations and professional organizations. Issues related to the Physician Assistant practice such as billing and coding and PA practice settings will also be covered. Students will acquire knowledge of various aspects of the Physician Assistant profession including, but not limited to state regulatory systems, credentialing, and the globalization of the profession.</p>
PAST 522	Legal & Ethical Aspects of Medicine	<p>This course is designed to give students an appreciation of medical ethics and their legal implications. Lectures will provide students with a basic understanding of the ethical responsibilities of Physician Assistants as health care practitioners and as individuals. The course will provide insight and foster critical thinking in the practical application of ethical issues that arise in the practice of medicine. The course will encourage the attributes of respect for self and others and a commitment to welfare of the patient. Legal issues such as litigation and contemporary medical legislation will be discussed.</p>
PAST 523	Evidence-Based Med & Population Health	<p>This course is designed to provide the students with an introduction to locating, reading and evaluating medical literature and current medical evidence, as well as public health concepts. The first module of the course will consist of lectures in basic public health concepts. The second module of the course will be delivered online and will consist of instruction on basic evidence based practices. Students will be instructed in medical literature searches, evaluation of literature, and how to use the results of their research. Students will be required to critically appraise current literature, and to construct quality clinical questions surrounding medical cases.</p>
PAST 530	Clinical Medicine I	<p>This is the first of a series of four Clinical Medicine courses. This course will cover all aspects of common medical conditions, including epidemiology, clinical presentation, diagnostic evaluation, management and prognosis. The course content is integrated with content in Physiology and Pathophysiology I, Clinical Skills I, and Pharmacology and Clinical Therapeutics I which will provide a foundation for Clinical Medicine I. The following organ systems will be covered in this semester: genetics, hematology & oncology, infectious disease, otorhinolaryngology, and dermatology. The course will consist of lectures and small group seminars which will foster the development of critical thinking in the evaluation and management of patients.</p> <p>Prerequisites: Successful completion of all Pre-Fall course work is required to enroll in this course.</p>

PAST 533	Clinical Medicine II	<p>This is the first of a series of four Clinical Medicine courses. This course will cover all aspects of common medical conditions, including epidemiology, clinical presentation, diagnostic evaluation, management and prognosis. The course content is integrated with content in Physiology and Pathophysiology I, Clinical Skills I, and Pharmacology and Clinical Therapeutics I which will provide a foundation for Clinical Medicine I. The following organ systems will be covered in this semester: dermatology, otorhinolaryngology, ophthalmology, hematology, oncology, and genetics. The course will consist of lectures and small group seminars which will foster the development of critical thinking in the evaluation and management of patients.</p> <p>Prerequisites: Successful completion of all Pre-Fall course work is required to enroll in this course.</p>
PAST 534	Clinical Medicine III	<p>This is the third of a series of four Clinical Medicine courses. This course will cover all aspects of common medical conditions, including epidemiology, clinical presentation, diagnostic evaluation, management and prognosis. The course content is integrated with content in Physiology and Pathophysiology II, Clinical Medicine II, Clinical Skills II, and Pharmacology and Clinical Therapeutics II which will provide a foundation for Clinical Medicine III. The following organ systems will be covered in this semester: neurology, wound management and surgical procedures, and geriatric assessments. The course will consist of lectures and small group seminars which will foster the development of critical thinking in the evaluation and management of patients.</p> <p>Corequisite: Concurrent enrollment in PAST533 Clinical Medicine II is required to enroll in this course.</p> <p>Prerequisites: Successful completion of all Fall 1 course work is required to enroll in this course.</p>
PAST 535	Clinical Medicine IV	<p>This is the fourth of a series of four Clinical Medicine courses. This course will cover all aspects of common medical conditions, including epidemiology, clinical presentation, diagnostic evaluation, management and prognosis. The course content is integrated with content in Physiology and Pathophysiology III, Clinical Skills III, and Pharmacology and Clinical Therapeutics III which will provide a foundation for Clinical Medicine IV. The following organ systems will be covered in this semester: neurology, ophthalmology, rheumatology, women's health and geriatric medicine. The course will consist of lectures and small group seminars which will foster the development of critical thinking in the evaluation and management of patients. Successful completion of all Spring 1 course work is required to enroll in this course.</p>
PAST 540	Clinical Skills I	<p>This is the first of three courses in the Clinical Skills series. This course is designed to guide the Physician Assistant student through diagnostic tests and clinical procedures associated with conditions commonly encountered in the medical setting. This course is closely aligned with Clinical Medicine I, and will cover diagnostic testing and procedures related to genetics, hematology, oncology, infectious disease and dermatology. The class will consist of lectures and labs, as well as participation in the Jefferson Health Mentors Program.</p> <p>Prerequisites: Successful completion of all Pre-Fall course work is required to enroll in this course.</p>
PAST 541	Clinical Skills II	<p>This is the second of three courses in the Clinical Skills series. This course is designed to guide the Physician Assistant student through diagnostic tests and clinical procedures associated with conditions commonly encountered in the medical setting. This course is closely aligned with Clinical Medicine II and Clinical Medicine III, and will cover diagnostic testing and procedures related to cardiology, pulmonology, urology, nephrology, endocrinology, gastroenterology and orthopedics. The class will consist of lectures and labs, as well as participation in the Jefferson Health Mentors Program.</p> <p>Prerequisites: Successful completion of all Fall 1 course work is required to enroll in this course.</p>

PAST 542	Clinical Skills III	<p>This is the third of three courses in the Clinical Skills series. This course is designed to guide the Physician Assistant student through diagnostic tests and clinical procedures associated with conditions commonly encountered in the medical setting. This course is closely aligned with Clinical Medicine IV and Special Topics in Medicine. The course will cover diagnostic testing and procedures related to neurology, neurology, wound management and surgical procedures, and geriatric assessments. Students will perform pelvic and testicular examinations on standardized patients. The class will consist of a combination of lectures and labs.</p> <p>Prerequisites: Successful completion of all Spring 1 course work is required to enroll in this course.</p>
PAST 550	Pharm & Clinic Therapeutics I	<p>This is the first of three courses in Pharmacology and Clinical Therapeutics. This course will provide an in depth survey on the general principles of pharmacology and the application of these principles to patient care situations. Students will learn the principles of pharmacokinetics, pharmacodynamics, and pharmacogenetics. Instruction on individual drugs or drug classes will include dosage forms, dose-response relationships, mechanism of action, side effects and toxicities, contraindications, and drug interaction. This course will cover medications related to hematology and oncology, infectious disease, otolaryngology, ophthalmology, psychiatry and dermatology.</p> <p>Prerequisites: Successful completion of all Pre-Fall course work is required to enroll in this course</p>
PAST 551	Pharm & Clinic Therapeutics II	<p>This is the second of three courses in Pharmacology and Clinical Therapeutics. This course will provide an in depth survey on the general principles of pharmacology and the application of these principles to patient care situations. Instruction on individual drugs or drug classes will include dosage forms, dose-response relationships, mechanism of action, side effects and toxicities, contraindications, and drug interaction. This course will cover agents used in cardiology, pulmonology, endocrinology, nephrology, urology, and gastroenterology.</p> <p>Prerequisites: Successful completion of all Fall 1 course work is required to enroll in this course.</p>
PAST 552	Pharm & Clinical Therapy III	<p>This is the third of three courses in Pharmacology and Clinical Therapeutics. This course will provide an in depth survey on the general principles of pharmacology and the application of these principles to patient care situations. Instruction on individual drugs or drug classes will include dosage forms, dose-response relationships, mechanism of action, side effects and toxicities, contraindications, and drug interaction. This course will cover agents used in neurology, rheumatology, women's health, ophthalmology, and nutritional supplements. The course will also cover the effects of medications in the pediatric, pregnant and geriatric populations.</p> <p>Prerequisites: Successful completion of all Spring 1 course work is required to enroll in this course.</p>
PAST 560	Physiology & Pathophysiology I	<p>This is the first of three courses in Physiology and Pathophysiology. The course follows an organ systems organization, and is closely integrated with Clinical Medicine I and Physical Diagnosis. The course focuses on normal and abnormal organ function. Lectures will proceed through the organ systems, emphasizing first the normal physiology of the system, followed by the pathophysiology of diseases related to that system. This semester topics to be covered will include cellular physiology and biochemistry, inflammation, immunology, hematology, neurology and dermatology.</p> <p>Prerequisites: Successful completion of all Pre-Fall course work is required to enroll in this course.</p>

PAST 561	Physiology & Pathophys II	<p>This is the second of three courses in Physiology and Pathophysiology. The course follows an organ systems organization, and is closely integrated with Clinical Medicine II and III. The course focuses on normal and abnormal organ function. Lectures will proceed through the organ systems, emphasizing first the normal physiology of the system, followed by the pathophysiology of diseases related to that system. This semester topics to be covered will include the cardiology, pulmonology, nephrology, urology, endocrinology and gastroenterology.</p> <p>Prerequisites: Successful completion of all Fall 1 course work is required to enroll in this course.</p>
PAST 562	Physio & Pathophysiology III	<p>This is the third of three courses in Physiology and Pathophysiology. The course follows an organ systems organization, and is closely integrated with Clinical Medicine IV. The course focuses on normal and abnormal organ function. Lectures will proceed through the organ systems, emphasizing first the normal physiology of the system, followed by the pathophysiology of diseases related to that system. This semester topics to be covered will include the neurology, ophthalmology, rheumatology, women's health and the pathophysiology of aging.</p> <p>Prerequisites: Successful completion of all Spring 1 course work is required to enroll in this course.</p>
PAST 570	Behavioral Science	<p>This course introduces counseling and behavioral science theories, skills and tools to the Physician Assistant student to enhance communication skills and enhance understanding of the process of changing health behaviors. This course will focus on cultural issues, recognition and management of domestic violence and abuse, human sexuality, issues related to death and dying, and common psychiatric conditions.</p> <p>Prerequisites: Successful completion of all Pre-Fall course work is required to enroll in this course.</p>
PAST 581	Health Promotion and Disease Prevention	<p>This course is designed to give the physician assistant student the knowledge and skills to apply principles of health promotion and disease prevention in a variety of clinical and community settings. The course provides instruction in social issues that affect medical care, principles of preventive medicine, medical nutrition, and principles of communication that will aid in promoting healthy behaviors in the community. This course contains a combination of lectures, case presentations, readings and small group sessions to develop the clinical medicine skills and knowledge set that a physician assistant will need to deliver and enhance patient care in the clinical practice settings. Successful completion of all Pre-Fall course work is required to enroll in this course.</p>
PAST 590	Special Topics in Medicine	<p>This course is designed to provide an in depth survey of medical specialties. The course will be presented in four modules: Emergency Medicine, Surgery, Pediatrics, and care of special populations.</p> <p>Prerequisites: Successful completion of all Spring 1 course work. Students will also need to complete Advanced Cardiac Life Support (ACLS) training and certification within this course.</p>
PAST 601	Internal Medicine Clinical	<p>This course is designed to provide the physician assistant student with the experience in caring for and managing the adult population in the inpatient setting. The student will develop the basic knowledge, skills, and attitudes necessary to build a solid foundation for the evaluation, documentation, diagnosis and treatment of problems common in the inpatient setting. Students will build upon the knowledge and refine the skills learned throughout the didactic year, and will focus on the common conditions encountered in the adult inpatient setting. Students will be assigned to a supervised clinical practice site where they will be supervised by a preceptor(s). The student will be evaluated through preceptor evaluations, an examination, and assignments.</p> <p>Prerequisites: Successful completion of all didactic courses, successful completion of the Didactic Comprehensive Examination, ACLS and BLS certification</p>

PAST 610	Emergency Medicine	<p>This course is designed to provide the physician assistant student with the basic knowledge, skills, and attitudes necessary to build a solid foundation for the evaluation, documentation, diagnosis and treatment of problems common in the emergency department setting. Students will build upon the knowledge and refine the skills learned throughout the didactic year, and will focus on the common conditions encountered in pediatric and adult patients in the emergency setting. Students will be assigned to a supervised clinical practice site where they will be supervised by a preceptor(s). The student will be evaluated through preceptor evaluations, an examination, practical, and assignments.</p> <p>Prerequisites: Successful completion of all didactic courses, successful completion of the Didactic Comprehensive Examination, ACLS and BLS certification</p>
PAST 620	Women's Health Clinical	<p>This course is designed to provide the physician assistant student with the basic knowledge, skills, and attitudes necessary to build a solid foundation for the evaluation, documentation, diagnosis and treatment of problems common in the women's health care. Students will build upon the knowledge and refine the skills learned throughout the didactic year, and will focus on the common conditions encountered in women's health, with a focus on care of the female patient, gynecology and prenatal care. Students will be assigned to a supervised clinical practice site where they will be supervised by a preceptor(s). The student will be evaluated through preceptor evaluations, an examination, a practical, and assignments.</p> <p>Prerequisites: successful completion of the Didactic Comprehensive Examination, ACLS and BLS certification</p>
PAST 630	Behavioral Medicine Clinical	<p>This course is designed to provide the physician assistant student with the basic knowledge, skills, and attitudes necessary to build a solid foundation for the evaluation, documentation, diagnosis and treatment of problems common in behavioral medicine. Students will build upon the knowledge and refine the skills learned throughout the didactic year, and will focus on the common conditions encountered in the management of psychiatric disorders, along with understanding the role of psychiatrists, psychologists, social workers and nurses in the care of the psychiatric patient. Students will be assigned to a supervised clinical practice site where they will be supervised by a preceptor(s). The student will be evaluated through preceptor evaluations, an examination, and assignments.</p> <p>Prerequisites: Successful completion of all didactic courses, successful completion of the Didactic Comprehensive Examination, ACLS and BLS certification are required to enroll in this course</p>
PAST 640	Surgery Clinical	<p>This course is designed to provide the physician assistant student with the basic knowledge, skills, and attitudes necessary to build a solid foundation for the evaluation, documentation, diagnosis and operative treatment of conditions commonly encountered in acute and chronic surgical care settings. Students will build upon the knowledge and refine the skills learned throughout the didactic year, and will focus on the acute and chronic conditions which can be managed surgically. Students will be assigned to a supervised clinical practice site where they will be supervised by a preceptor(s). The student will be evaluated through preceptor evaluations, an examination, and assignments. Successful completion of all didactic courses, successful completion of the Didactic Comprehensive Examination, ACLS and BLS certification are required to enroll in this course.</p>

PAST 650	Primary Care Clinical	<p>This course is designed to provide the physician assistant student with the basic knowledge, skills, and attitudes necessary to build a solid foundation for the evaluation, documentation, diagnosis and treatment of problems common in the primary care setting. Students will build upon the knowledge and refine the skills learned throughout the didactic year, and will focus on the common conditions encountered in the primary care setting. Students will be assigned to a supervised clinical practice site where they will be supervised by a preceptor(s). The student will be evaluated through preceptor evaluations, an examination, and assignments.</p> <p>Prerequisites: Successful completion of all didactic courses, successful completion of the Didactic Comprehensive Examination, ACLS and BLS certification are required to enroll in this course.</p>
PAST 660	Pediatrics Clinical	<p>This course is designed to provide the physician assistant student with the basic knowledge, skills, and attitudes necessary to build a solid foundation for the evaluation, documentation, diagnosis and treatment of problems common in pediatric patients, as well as routine well child care. Students will build upon the knowledge and refine the skills learned throughout the didactic year, and will focus on common conditions seen in pediatric patients, well child care, developmental surveillance and health promotion. Students will be assigned to a supervised clinical practice site where they will be supervised by a preceptor(s). The student will be evaluated through preceptor evaluations, an examination, and assignments.</p> <p>Prerequisites: Successful completion of all didactic courses, successful completion of the Didactic Comprehensive Examination, ACLS and BLS certification are required to enroll in this course.</p>
PAST 670	Elective Clinical	<p>This course is designed to provide the physician assistant student with the basic knowledge, skills, and attitudes necessary to build a solid foundation for the evaluation, documentation, diagnosis and treatment of problems common in one of several inpatient or outpatient setting of a clinical specialty. Students will build upon the knowledge and refine the skills learned throughout the didactic year. Students will be assigned to a supervised clinical practice site where they will be supervised by a preceptor(s). The student will be evaluated through preceptor evaluations, a presentation, and an examination. Successful completion of all didactic courses, successful completion of the Didactic Comprehensive Examination, ACLS and BLS certification are required to enroll in this course.</p>
PAST 680	Healthcare I	<p>This course is designed to educate the physician assistant student about the US Healthcare system, including health care policy, delivery and financing. Specific topics will include the historical underpinning of healthcare policy, the healthcare system, hospitals, ambulatory care, quality assurance and risk management in clinical practice, education, personnel, financing, insurance, managed care, behavioral and mental health, and long term care. Combined lectures and readings are designed to develop the knowledge base that a physician assistant will need in a healthcare setting. Lectures will be delivered online. Students will be evaluated by participation and an examination at the completion of the course.</p> <p>Prerequisites: Successful completion of all didactic coursework is required to enroll in this course.</p>
PAST 681	Healthcare II	<p>This course is designed to provide instruction in the steps needed for the Physician Assistant student to transition into clinical practice, reviewing the necessary employment search, certification, and licensure for practicing physician assistants. The course will include lectures, case presentations, and reading assignments. Lectures will be given during Transition Days and online. Students will be evaluated by participation and an examination at the completion of the course.</p> <p>Prerequisites: Successful completion of all didactic coursework is required to enroll in this course.</p>

PAST 690	Graduate Project I	<p>The Graduate Project is a two part course, culminating in a graduate level paper suitable for publication and a related Grand Rounds Presentation. Combined, these are part of a summative evaluation tool used to measure cognitive, motor, and affective domains at a point near the completion of the program. The paper will be based on an interesting patient or condition encountered on a clinical rotation, an area of clinical interest, the basis of a research or grant proposal, or an area of medicine impacted by the medical economics, practice regulations, access to care, or epidemiology.</p> <p>Graduate Project I is an independent study course that provides the initial structure for the final paper and the Grand Rounds Presentation in Graduate Project II. Students will work closely with their assigned faculty advisor throughout this course.</p> <p>Prerequisites: Successful completion of all didactic coursework is required to enroll in this course.</p>
PAST 691	Graduate Project II	<p>The Graduate Project is a two part course, culminating in a graduate level paper suitable for publication and a related Grand Rounds Presentation. Combined, these are part of a summative evaluation tool used to measure cognitive, motor, and affective domains at a point near the completion of the program. The paper will be based on an interesting patient or condition encountered on a clinical rotation, an area of clinical interest, the basis of a research or grant proposal, or an area of medicine impacted by the medical economics, practice regulations, access to care, or epidemiology.</p> <p>Graduate Project II is an independent study course, during which the student will continue to work with their assigned faculty advisor to create a graduate level paper, as well as a Grand Rounds Presentation that will be delivered to students, faculty, and invited guests, at the completion of the course.</p> <p>Prerequisites: Successful completion of all didactic coursework and Graduate Project I is required to enroll in this course.</p>
PAST 695	Summative Evaluation Course	<p>This course is a zero-credit course that is designed to manage and document the graduation progression requirements and summative activities associated with the Physician Assistant Program. Students are provided examination activities to demonstrate proficiency in skills and content knowledge at specific intervals to progress.</p>
PHYSIOLOGY (JCLS)		
PS 520	Mammalian Physiology	<p>Core information on the physiologic process in health, with special attention to functions of organs and systems and the mechanisms of their integration is provided. The physiologic bases of dysfunctions and the various aspects of applied physiology that constitute the foundations of medicine are discussed.</p>
PS 612	Pulmonary Physiology	<p>Pathophysiology of pulmonary edema; protein permeability of the air-blood barrier, diffusive and convective flux of water and protein, perivascular and peribronchial interstitial fluid cuffing, alveolar flooding, lymphatic drainage of the lung, microvascular pressure and the vascular water fall.</p>
PS 613	Muscle Physiology	<p>Selected topics on the properties of muscle and other tissues having contractile properties, including electrical and mechanical phenomena, energetics, neurotropism, modification of intrinsic regulation through evolution. Seminars and lectures requiring reading and discussion of classic and current literature.</p>
PS 617	Literature Review	<p>A critical review of the recent literature on a topic of interest to the student (not related to thesis research) which includes a proposed problem of study and rationale for conducting the investigation.</p>
PS 621	Endocrine Physiology	<p>Physiology of endocrine glands; synthesis and elaboration of hormones, hormonal feedback systems, endocrine-nervous system interrelations, hypothalamic regulation of pituitary secretions, endocrine regulation of body function.</p>

PS 623	Renal Physiology	Selected aspects of electrolyte transport with emphasis on models of sodium reabsorption, potassium excretion and adaptation, bicarbonate reabsorption, and acid excretion, evaluation of models for concentration and dilution, discussion of hormonal modulation of renal function including catecholamines, ADH, prostaglandins and the renin-angiotensin system.
PS 624	Energy Transduction	A discussion of energy transduction in biological systems. Topics include the thermodynamics of biological processes, energetics of muscle contraction, active transport mechanisms, and oxidative phosphorylation. Course includes student presentations of related subject material.
PS 627	Literature Review	A critical review of the recent literature on a topic of interest to the student (not related to thesis research) which includes a proposed problem of study and rationale for conducting the investigation.
PS 631	Membrane/Cell Physiology	The course will focus on aspects of receptor-mediated signal transduction, activation of second messenger systems, and the regulation of cellular proliferation and differentiation. The course includes review of original literature and presentations by the students.
PS 632	Cardiovascular Physiol	The course is designed to explore in detail factors underlying the contractile process and cardiac function, including the regulation of electrical, mechanical and metabolic processes in normal and pathological states. The course emphasis is on: 1) the study of recent works which have contributed to our present understanding of these processes, and 2) consideration of factors affecting cardiac function of which our understanding is incomplete.
PS 633	Pathophys-Circulatory Disease	Lectures, discussions, readings and seminars on current problems in the mechanisms of acute circulatory traumatic states such as circulatory shock (e.g., hemorrhagic, endotoxic, cardiogenic, bowel ischemia, etc.), acute myocardial ischemia, myocardial infarction including reperfusion injury. Emphasis will be placed on integration of physiologic mechanisms, particularly humoral mediators, responsible for disruption of circulatory homeostasis.
PS 634	Adv Neurophysiology	This course will examine the function and structure of ion channels found in the plasma membrane of excitable cells (nerves and muscles). Functional studies will stress patch clamp, single channel recording, and heterologous expression of cloned and mutated channel proteins. A theoretical introduction to the biophysics of ion channels will be presented, and current research papers will be presented by the students.
PS 637	Literature Review	A critical review of the recent literature on a topic of interest to the student (not related to thesis research) which includes a proposed problem of study and rationale for conducting the investigation.
PS 651	Special Topics Signal Transduction	A seminar series to elucidate and integrate various aspects of contemporary knowledge of specific physiological phenomena and underlying signal transduction mechanisms. This course coincides with meetings of the signal transduction core group.
PS 652	Special Topics Ion Chan Biophysics	A seminar series to elucidate and integrate various aspects of contemporary knowledge of ion channel biophysics. This course coincides with meeting of the ion channel core group.

PS 653	Special Topics in Motility	A seminar series to elucidate and integrate various aspects of motility including skeletal, cardiac, and smooth muscle biophysics and regulation. This course coincides with meetings of the motility core group.
PS 655	Fundamentals of Integrative Physiology	This course surveys major mammalian and human physiological systems. It introduces major physiological concepts through a systems approach. The course will discuss current vertebrate animal models including recent knockout mouse technology.
PS 710	Seminar	Required of all graduate students in Physiology. Presentations by staff and invited speakers of new developments in their research activities.
PS 720	Seminar	Required of all graduate students in Physiology. Presentations by staff and invited speakers of new developments in their research activities.
PS 722	Scientific Lecturing	This course is designed as a group practice in the art of lecturing. Students are taught principles of evaluation of scientific lectures which they subsequently use in preparing and delivering lectures. Aside from the first class, at which the philosophy, organizational plans, and techniques of effective lecturing are discussed, emphasis is placed on student presentations to the class. The topic of these presentations is selected by each student and therefore may be directed toward a research topic or a basic science subject of the student's choice. The lectures will be evaluated by each class member using a standardized form requiring notes on the scientific content as well as the presentation, and by the lecturer who will observe his/her lecture by video playback. Class discussions will be held after the evaluations are complete to assess the strengths and weaknesses of each lecture.
PS 723	Scientific Writing	The purpose of this course is to provide guidelines for writing clear scientific papers. This goal is met by discussion of reading and homework assignments, and submission of a new, original scientific paper in an area chosen by each student. The paper should adhere to scientific journal format appropriate for the subject matter or discipline.
PS 730	Seminar	The courses facilitate student development in the skills that enable them to read and evaluate critically current scientific literature. These courses will deal in depth with a specific topic in physiology. The class will meet biweekly in the format of a journal club. Class will consist of student presentations and discussions under the guidance of participating faculty. Students will present on a rotating basis and will be expected to lead a discussion of a current scientific paper.
PS 731	Current Literature -PS II	The courses facilitate student development in the skills that enable them to read and evaluate critically current scientific literature. These courses will deal in depth with a specific topic in physiology. The class will meet biweekly in the format of a journal club. Class will consist of student presentations and discussions under the guidance of participating faculty. Students will present on a rotating basis and will be expected to lead a discussion of a current scientific paper.
PS 732	Current Literature-PS III	The courses facilitate student development in the skills that enable them to read and evaluate critically current scientific literature. These courses will deal in depth with a specific topic in physiology. The class will meet biweekly in the format of a journal club. Class will consist of student presentations and discussions under the guidance of participating faculty. Students will present on a rotating basis and will be expected to lead a discussion of a current scientific paper.
PS 740	Historical Development Physiology	The course provides an introduction to the historical development of physiological concepts. A lecture-seminar format with selected readings of classical physiology literature gives the students a review of the historical development of recent physiological discoveries.

PS 910	Research	First year students spend four weeks in each of four staff members' laboratories becoming acquainted with the kinds of research and techniques employed prior to choosing an advisor. Choice of an advisor is made no later than the end of the summer following the first year, at which time the trainee works in the laboratory of his or her advisor until completion of the training program.
PS 920	Research	First year students spend four weeks in each of four staff members' laboratories becoming acquainted with the kinds of research and techniques employed prior to choosing an advisor. Choice of an advisor is made no later than the end of the summer following the first year, at which time the trainee works in the laboratory of his or her advisor until completion of the training program.
PS 930	Research	Under the supervision of a member of the graduate faculty and guidance of a thesis research committee, the student will learn research design, methodology, and experimental techniques relevant to the graduate program. Research leading to the doctoral thesis is a major requirement for the Ph.D. degree and will occupy a dominant part of the student's time and attention.
POPULATION HEALTH (DHSc)		
DHS 700	Descriptive Research Methods	This course examines observational methods used in applied population health research, including survey methodology, qualitative and mixed methods approaches, record abstraction, case studies, correlational and cross-sectional studies, cohort and panel studies, and methods to assess reliability and validity.
DHS 701	Population Health Research Methods	This course provides an overview of the field of health services research as it applies to population health, offering a fundamental framework for health research methods, including critical analysis of population health and health services research literature. Each research method/technique and associated topic areas will be presented through lecture and reinforced through small group exercises and homework. A classical validity approach to the design and evaluation of health intervention programs will serve as the foundation for this course. Classical theories of causality and experimental design to include operationalization of variables, threats to validity, and experimental, quasi-experimental and non-experimental research designs will be covered.
DHS 702	Population Health Management Strategies	Provides comprehensive overview of population health, value-based care, and evolution of payment models for the healthcare executive. Prepares leaders to evaluate current models of care and to develop new models based upon organizational preparedness and population needs, including the social determinants of health. Explores clinical care management programs including risk scoring and stratification, transitions of care, pharmacy management, mobile health, care of complex populations, palliative and end of life care, behavioral health, and future trends.
DHS 703	Systematic Reviews & Analysis	This course examines the methods and tools used in conducting and analyzing systematic reviews of the literature, including constructing research questions, defining inclusion and exclusion criteria, search strategy, record abstraction, data management, data synthesis, and methods to address bias and other influences on research outcomes and interpretation. The course will also review recommended protocols for conducting and reporting systematic reviews of the literature and related research (i.e., PRISMA, SQUIRE, etc.).
DHS 704	Population Health Implementation Science I	Presents a multidisciplinary framework and methodology for healthcare leaders to integrate scientific evidence into strategy and operations. Addresses the evaluation of evidence, stakeholder/organizational readiness, systems-thinking, and approaches to implementation. Provides opportunities to develop design strategies, assess data needs, and complete a project implementation plan.

DHS 705	Population Health Implementation Science II	This course applies statistical and methodological concepts to specific implementation research projects conducted in population health, including quality and patient safety improvement, patient and panel risk prediction and management, service line growth strategies, resource management, and other critical operations.
DHS 706	Academic & Professional Writing	This is a writing-intensive course designed to sharpen the academic and professional writing skills of healthcare leaders to produce high quality scholarship and thought leadership.
DHS 750	Beginning Residency	This session provides a high-level overview of key concepts in population health and related research, including: health disparities, social determinants of health, the role of data, value-based care and alternative payment models. Contemporary issues and challenges in population health are explored in a roundtable discussion with select speakers and presenters from the annual Population Health Colloquium.
DHS 751	Spring Residency	This session provides content focused on developing dissertation research, including selection of appropriate models, how to frame questions, where to find data, and how to use it to make decisions. It will include opportunities for students to write, review, and critique sample proposals, as well as a workshop regarding how to access university research resources and writing supports.
DHS 752	Fall Residency	The program requires attendance at two in-person sessions each year of the program. Program Director will be in touch with further details.
DHS 753	Spring Residency	The program requires attendance at two in-person sessions each year of the program. Program Director will be in touch with further details.
DHS 754	Fall Residency	The program requires attendance at two in-person sessions each year of the program. Program Director will be in touch with further details.
DHS 755	Summer Residency	The program requires attendance at two in-person sessions each year of the program. Program Director will be in touch with further details.
DHS 800	Dissertation I	Stage 1 of the dissertation development process. Students must submit the final approved dissertation proposal to receive course credit.
DHS 801	Dissertation II	Stage 2 of the dissertation development process. Students must make satisfactory progress on the dissertation to receive course credit.
DHS 802	Dissertation III	Stage 3 of the dissertation development process. Students must submit the final dissertation document and successfully present the dissertation project to receive course credit.
POPULATION HEALTH		
POP 500	Essentials of Population Health	Provides a foundation for population health beginning with a working definition, incorporating public health science and policy. From a health system perspective, addresses how to assess population health needs, including and Community Health Needs Assessments, clinical and claims data, to develop management strategies which address clinical and social determinants of health. Confronts how to effectively address the national swing from volume-based to value-based care through a deeper understanding of payment models and use of data and technology. Prepares for the transformational changes affecting the future by exploring emerging technologies and disruptive new care models.

POP 510	Health Economics, Risk, & Finance	This course covers the basic principles of economics and healthcare finance and applies them to risk and insurance. Primary objectives are to illustrate the determinants of value in health care, describe the role of supply and demand, and understand the application of the income statement, balance sheet, and financial analysis to population health decision making. The assignments are designed to give the student experience with dashboards and claims data analysis and presentation.
POP 516	Teaching Population Health	In this course, students will examine the principles of effective adult-based education; evaluate strategies to increase learner satisfaction and knowledge retention; discuss how to implement a 'backwards design' curriculum development strategy for learners; and identify methods to assess learner satisfaction, knowledge attainment, and skill development. Students will also create a lesson plan for an educational program in Population Health.
POP 541	Population Health for Employers	This course considers how general concepts in population health management can be applied specifically by employers and their agents such as benefits consultants and service vendors to the population of employees and dependents. The emphasis is on improving the health and productivity of the workforce, and deriving value from health and well-being benefits and programs, by applying population health concepts and tools. Specific examples of evidence-based programs and tools available for managing employed populations will be studied.
POP 542	Population Health Analytics for Employers	The overall goal of the Population Health Intelligence for Employers (POP 542) course is to educate and train students how to identify, capture, evaluate, apply, and continuously improve the use and measurement of data and information about the purchasing and delivery of healthcare services to optimize workforce health and productivity and top and bottom line company performance. By accomplishing this goal, students will be prepared to become either executives in charge of employee health data analytics or intelligence for either their present or future employers, or to serve as trusted advisors in these areas on behalf of current or prospective employer clients.
POP 543	Wellness, Prevention, & Chronic Disease Management for Employees	This course has been designed to prepare students to evaluate, design, and implement condition-focused and lifestyle-based wellness programs. Through readings, lectures, and discussions, students will explore behavioral change theory and patient engagement approaches to create lasting change within patient populations that drive towards positive cost, quality, and productivity outcomes. Leaders, consultants, and vendors will feel equipped to create an environment where patients are active participants in their healthcare journey.
POP 544	New Models and Employee Health Care	Through a detailed exploration of newer models of care and the application of population health principles, this course will prepare individuals to improve the health of employees while reducing the health care costs. Emphasis is placed on new models of virtual, team-based primary and specialty care. Depth of knowledge is gained in population health as applied to employees, strategies for managing vendors are presented, and the current and future state of care models are evaluated. Utilizing a case study format the student is challenged to apply the presented concepts to create, implement, and present a new model of care for employees.

POP 545	Population Health Law for Employers	Provides a basic understanding of the foundational areas of Health Care law: Medical Liability, Private Insurance; the structure of health care entities; laws controlling Fraud, Abuse and Waste; and economic reform of Health Care. Also covers areas of health law of particular interest to employers, viz. ERISA, OSHA and CDC regulations on workplace safety (particularly during pandemics), how to use employee data in compliance with HIPAA, EEOC and GINA regulations and incentives for participation in and results from employee wellness programs. Addresses the study of case law and regulations, with an eye toward understanding how they support the public policy drivers of cost of health care, access to providers, quality of care, and patient choice. Lectures incorporate the practical application of the law in the healthcare professions. Weekly discussions and quizzes provide students the opportunity to demonstrate their understanding of the material and to discuss policy issues behind various legal concepts in health care. Discussions and assignments apply course material to "real world" situations encountered in health care.
POP 560	Population Health Strategy & Management I	Provides comprehensive overview of population health, value-based care, and evolution of payment models. Prepares students to evaluate current models of care and to develop new models based upon organizational preparedness and population needs including the social determinants of health. Explores clinical care management programs including risk scoring and stratification, transitions of care, pharmacy management, mobile integrated health, care of complex populations, palliative and end of life care, and integrated behavioral health. Prerequisites: Firstfew courses in MS
POP 561	Population Health Strategy & Management II	Builds upon Pop 560 by preparing students to apply principles and practical aspects of population health management, value-based care and payment, to clinically integrated networks, accountable care organizations, and health systems. Critically examines organizational readiness for the transition from fee- for-service to value-based care and payment. Explores risk contracting strategies and pitfalls and lessons learned from international population health management programs. Addresses employer-directed health plans, application of technology (including population health information systems, telehealth, predictive analytics, and artificial intelligence), ethical and legal issues, and innovation. Prerequisite: POP 560
POP 650	Capstone	POP 650 is designed to provide a culminating experience that demonstrates the student's professional achievement, with integration of the core competencies that have been developed throughout the Masters of Population Health program. A Capstone project is developed in conjunction with the Capstone Director (usually the Program Director) with production of a scholarly paper of publishable quality, and a live or virtual public presentation of the work. Although POP 650 is typically the last course of the curriculum, development of the project can begin 6-12 months before graduation.
POPULATION HEALTH PHARMACY		
PHP 501	Pharmaco-epidemiology	Pharmacoepidemiology provides an introduction to the field of pharmacoepidemiology, which uses epidemiologic methods to examine the benefits or risks of medications and vaccines, drug utilization patterns, and adherence in various populations. This course will: explain what pharmacoepidemiology is and what types of study designs are used; discuss the roles that pharmacoepidemiology studies have regarding drug use and health outcomes; and describe the threats to validity that are possible in pharmacoepidemiologic studies and the variety of solutions available to avert or control for these threats. This information will prepare students to interpret and critique, in writing and through presentations, studies from the pharmacoepidemiology literature.
PHP 502	Applied Pharmaco-economics	Applied Pharmacoconomics focuses on the theories, methods, and computer modeling of pharmaco-economic principles in the context of applying principles to improve resource allocation within medication use systems.

PHP 503	Evidence-Based Medicine and Care Pathway Development	Evidence-Based Medicine and Care Pathway Development prepares students to implement evidence-based medicine to create care pathways that increase patient safety, improve health outcomes, and reduce health care resource utilization. PHP 503 reinforces concepts of biomedical literature review, health statistics, medication cost-effectiveness, and patient safety.
PHP 504	Pharmacy Informatics and Healthcare Data Analytics	Pharmacy Informatics and Healthcare Data Analytics provides an introduction to the field of Pharmacy Informatics and Healthcare Data. This course defines pharmacy informatics and discusses the unique and evolving roles pharmacists play in applying and managing health care medication data used for decision-making in various practice settings and assessing its data limitations and barriers. PHP 504 students will interpret and critique a wide variety of informatics systems and data initiatives and design a data project that optimizes an existing problem in the current U.S. health care system.
PHP 505	Pharmacy Benefit Design	Pharmacy Benefit Design prepares students to apply evidence-based medicine to create cost-containment strategies that enhance patient health outcomes while serving to optimize the use of health care resources. Focus on pharmacy benefit design, formulary management, utilization management, specialty pharmacy management, contracting, pricing, and rebatin
PHP 506	Capstone Seminar	The Capstone Seminar prepares students for the development and implementation of a capstone project. PHP 506 enhances the ability of students to interpret and apply data analytics, evidence-based medicine, pharmacoeconomics, and medication cost containment strategies. Students will discuss practical examples in using population health pharmacy and its impact on health outcomes.
PHP 507	Capstone	MS Population Health Pharmacy's Capstone course develops and presents a population health pharmacy project, which serves as culminating experience demonstrating satisfactory achievement in the principles of population health pharmacy.
POPULATION HEALTH SCIENCE		
PHS 602	Bioethics	This course introduces the discipline of bioethics from a research perspective. The course will provide an overview of the history of bioethics as well as defining key principles and analytical approaches to addressing current ethical issues encountered in human subject research.
PHS 605	Advanced Statistical Methods for Data Analysis	Presents general approaches to multivariate statistical analysis, including elaboration and control of confounding, and key multivariate statistical analysis techniques, i.e., analysis of variance; bivariate linear regression and correlation; multiple linear regression; multiple and partial correlation; and binary and multinomial logistic regression. Analyzes selected datasets, i.e., 2012 Southeastern Pennsylvania Household Health Survey performed by the Public Health Management Corporation, and federal datasets, e.g., NHANES. Prerequisite: PBH 504 or equivalent introductory graduate level statistics course

PHS 615	Advanced Statistics for Population Health Science: Multi-level Modeling	<p>This course introduces the multilevel model and multilevel statistical modeling (MLM), aka hierarchical linear modeling (HLM), a statistical approach for the analysis of clustered and hierarchical data. MLM can investigate the relationships between individuals and their contextual lives (neighborhoods, hospitals, families, etc.) to determine which individual and contextual variables contribute to outcomes. The course will introduce methods to determine the predictors at both levels and the variance between and within individual and contextual levels. This course also introduces methods for longitudinal modeling approaches and analysis in the same framework. The course will focus primarily on application of the statistical models using a freely available software specific to multilevel analysis (HLM 7). Thus, students who complete the course will be able to analyze multilevel cross-sectional and longitudinal data and interpret the results from such analysis.</p> <p>Prerequisites: Graduate level course in basic statistics (such as PBH 504), Graduate level course in advanced statistics (such as PBH 605)</p>
PHS 620	Teaching/ Learning Seminar	<p>Introduces fundamentals of course design and facilitation for classroom-based and online learning, including instructional design theory, online moderation techniques, technologies for online learning, development of course objectives, the Quality matters Rubric for quality online course design, and support resources available to both faculty and students.</p>
PHS 650	Evaluative & Outcomes & Research Design	<p>This course provides experience in design and critical review of scientific evaluative studies applicable to evaluation of health intervention programming. The course will cover material intended to enable students to critically examine various approaches and methods developed for interventional studies. Specifically, this course will use a classical validity approach to the design and evaluation of health intervention studies. The course will present classical theories of causality and experimental design to include operationalization of variables, threats to validity, and experimental, quasi-experimental and non-experimental research designs. The culminating assignment for the course is a research proposal for a population-health relevant evaluative research study and as such this course serves to prepare students for future technical writing and proposal development, the cornerstones of scientific communication and funding requests.</p>
PHS 660	Mentored Research Experience	<p>This course is intended as an opportunity for Population Health Science PhD students to gain skills and experience in the conduct of research and in the application of various research methods, and to apply already learned skills to real world research problems. Appropriate research activities may be any across the spectrum of research including planning a study, writing a grant application, joining an already underway research project as a research assistant, collecting data, data analysis and dissemination and/or authoring or co-authoring a manuscript. The student will choose a research mentor and arrange for the activities and deliverables that will constitute this course. The student is expected to work with the mentor/team to detail activities and deliverables that correspond to the number of credit hours for which the student is registered (1 cr = approx. 2-3 hrs/week).</p> <p>Prerequisites: Approval by Program Director</p>
PHS 680	Advanced Analytic Methods for Health Behavior Science	<p>Survey course of additional conceptual topics and corresponding analytic techniques relevant for health behavior science/ health behavior measurement including additional instruction on confirmatory factor analysis (not covered in PHS710 Advanced Health Behavior Methods and Measurement course), including invariance testing. Course also surveys selected implementation science and evaluation frameworks. The course will focus on conceptual understanding of these topics, their application and interpretation, rather than statistical treatments. The objective of this course is to equip students with expertise in a broad range of techniques and concepts common in health behavior science, and with adequate analytic expertise to conduct original research.</p>

PHS 700	Integrative Research Seminar	This "journal club" will be convened to discuss, analyze, and review articles from major journals. Its purpose will be to critically evaluate recent articles from the scientific literature. Participants will be expected to read and carefully review all manuscripts selected, and to voice their views in response to several questions such as the significance of the issue(s), appropriateness of the research design, the statistical analyses, and the plausibility of the findings.
PHS 710	Advanced Health Behavior Methods & Measurement	This course provides in-depth and applied measurement science training, and is an opportunity to build on concepts and theories in health behavior and health outcomes assessment and measurement. The central focus will be on the methodology of theory-based instrument development and testing, and the topics will take students through the life-cycle of a health measurement instrument from conceptualization through reliability and validity assessment and structural modeling. The objective of this course is to train students in the principles and practice of good health measurement. Prerequisites/Co-Requisites: PBH 602 or equivalent advanced course in health behavior science theory OR AHE 506 or equivalent course in psychometrics.
PHS 800	Comprehensive Exam Prep	This is a self-directed course for students to prepare for the PhD Comprehensive Examination, which is a requirement for Advancement to Candidacy for the PhD degree in the College of Population Health. Students will review exam requirements and the body of knowledge that will be tested. See the "PhD Comprehensive Examination and Dissertation Handbook" online under the Handbooks section of the Student Resources page at jefferson.edu/jcphsr for more information.
PHS 801	Comprehensive Exam	Students sign up for this course in the trimester in which they will take the PhD Comprehensive Exam. Exam results are recorded on this course. Students must retake this course if they do not pass all parts of the PhD Comprehensive Exam. Grades on subsequent examinations replace prior grades in this course. There is a maximum number of retakes allowed. See the "PhD Comprehensive Examination and Dissertation Handbook" online under the Handbooks section of the Student Resources page at jefferson.edu/jcphsr for more information.
PHS 805	Dissertation Proposal Seminar	Students sign up for this course to begin the development of the dissertation proposal. The course includes seminars and other activities to assist the student in developing a dissertation proposal that meets the requirements of the PhD in Population Health Sciences. The course culminates with the preparation of an annotated outline of the draft dissertation proposal.
PHS 807	Dissertation Proposal Defense	Students sign up for this course in the trimester in which they will defend the dissertation proposal. The results of the proposal defense are recorded on this course.
PHS 810	Dissertation Progress	Students sign up for this course after the successful defense of the dissertation proposal. This course is self-directed and provides additional time and support to complete the final dissertation document.
PHS 811	Dissertation Progress	Students sign up for this course in the trimester in which they will defend the final dissertation. The results of the final dissertation defense are recorded on this course.
PUBLIC HEALTH (JCLS)		
PH 501	Introduction to Public Health	The course introduces the history and basic principles of public health and their application to the development of activities that benefit the health status of populations. Students are introduced to a range of quantitative methods and public health resources used to monitor the health status of the community and evaluate public health interventions.

PH 502	Behavior & Social Theory/Public Health	Participants will demonstrate an understanding of the contributions of social and behavior science theory in the planning and implementations of Public Health Programs. Participants will apply relevant and behavioral theories to diagnose and understand individual, social network, organizational, community, and policy maker behaviors associated with the planning, implementation, and maintenance of Public Health Programs.
PH 504	Healthcare Economics	This course will introduce the principles of medical economics for graduate students who require a working knowledge of modern practices and forces at work. The course will consist of a series of interactive discussions that provide students with a background for understanding the field.
PH 505	Environmental/Occupational Toxicology	By the end of the course, students will be able to state the basic concepts of toxicology as applied to occupational and environmental exposure, able to discuss the toxicological principles as related to the effects of - and the body's response to toxic substances, able to explain movement of toxic agents through the environment, familiar with common exposure toxicants and their measurement in the human body, and able to discuss the assessment and control of industrial and environmental health hazards
PH 506	Health Services Research	The goal of this course is to provide students with an overview of the field of health services research (HSR), with the capacity for critical appraisal of the HSR literature, and with the ability to design a basic HSR research project. Specific competencies developed will include critical appraisal of the HSR literature, research question/hypothesis formulation, operational variable definition, choice of appropriate methodological designs, instrument design/construction, evaluation of reliability and validity, understanding of probability sampling techniques, and choice of appropriate statistical analysis techniques.
PH 507	Environmental Health	This course will introduce students to environmental factors that impact health. Research and practical examples will be used to facilitate the understanding of how toxicology, epidemiology, health and exposure surveillance can be used to determine the potential for health problems. The students will identify, assess, and analyze data and apply these skills to case studies and problem solving activities. Risk assessments related to environmental contaminants, such as chemicals, radiation, biological agents, or natural occurring problems, will be addressed and information will be reviewed to prioritize strategies for reducing environmental exposures. Pathways of human exposure from hazardous substances as they move through the environment will be studied. The role of environmental monitoring and the use of control techniques will be considered as means of reducing the impact of the environment on human health.
PH 508	Health Policy: International Perspective	The principal goal for the course is to enable students to understand how the US healthcare system operates and learn approaches to the organization and financing of healthcare in other developed countries.
PH 509	Health Communication	This course provides a broad introduction to health communication at both the individual and community levels. Students will be exposed to dominant approaches in health communication through a range of readings, lectures, audio-visual materials, case studies, and project-based assignments. Topics include micro- and macro-level theories of health behavior change, skills in patient care communication, role of communication in health care and public health promotion and disease prevention, design, implementation, and evaluation of health communication and social marketing campaigns, health literacy, media advocacy, and media and health. Focus is on developing both understanding and skills associated with health communication at the micro and macro levels.

PH 606	Qualitative Research Methods	The course will focus on introducing students to the back- ground, techniques, uses, ethical issues, strengths, limitations, and presentation approaches of a number of the most common forms of qualitative research. Class time will be divided between lectures and interactive group exercises.
PH 607	Intro to Geographic Info Systems	This course will employ GIS Tutorial for health, a textbook and CD designed for introducing geographic information system (GIS) software to health professionals. Students will use GIS to solve problems in health-care and gain hands-on experience visuallizing and analyzing health-related data. The scenarios in the exercises address various public health issues. Sample exercises will investigate topics such as cancer morbidity and mortality, health patterns of uninsured and poor populations, and environmental hazards.
PH 610	Capstone Seminar	This course will provide each student the opportunity to learn about and develop the building blocks for the MPH final project. The course will review the options or topics and types of projects and assist the students to choose a topic and project type if they have not done so already. The sessions will review the essential steps in the process of project development, from the choice of topic, and definition of the problem, all the way to plotting out the methods of analysis or evaluation. Students will have an opportunity to share and discuss their work at every stage with the other learners enrolled in the seminar.
PH 615	Planning and Evaluation	This course covers the processes of successful public health education program planning, implementation and evaluation, evaluation research methods, and grant writing. The goal is to train public health professionals to be effective program planners, managers, and evaluators. Examples will be drawn from health promotion, community development, and disease prevention programs with emphasis on local public health efforts. This course will address the following core public health competencies: Assessment Skills, Program Planning Skills, Communication Skills, Cultural Competency Skills, Community Dimensions of Practice Skills, Financial Planning and Management Skills, Leadership and Systems Thinking Skills.
PH 699	Independent Study	This masters-level seminar examines the health of human populations and the science of improving it in historical perspective. Special attention is given to the city of Philadelphia as a living laboratory of public health in the past and present. Lectures, readings, and discussions cover various societies' attempts to respond to and prevent disease since antiquity. Case studies focus on the roots of contemporary public health knowledge and policy in the nineteenth and twentieth centuries. Topics include responses to epidemics, the Bacteriological Revolution, racial and economic disparities in health, the development of policy infrastructures, and global health. Periodic field trips will be arranged to public health-related historical sites in Philadelphia and vicinity.
PH 710	Capstone Project	The Capstone is a guided project in public health under faculty supervision that approximates an achievement of a public health professional in public health practice. Written and oral presentation of the project is required.
PH 810	Clerkship-Public Health	The purpose of the clerkship is to encourage, enhance, and support a worksite/field experience as an integral part of the education and training of future public health practitioners. The clerkship is designed to promote professional development with opportunites in our local communities and in many foreign countries.
PH 820	Master's Clerkship-PH	The purpose of the clerkship is to encourage, enhance, and support a worksite/field experience as an integral part of the education and training of future public health practitioners. The clerkship is designed to promote professional development with opportunities in our local communities and in many foreign countries.

PH 830	Clerkship-Public Health	The purpose of the clerkship is to encourage, enhance, and support a worksite/field experience as an integral part of the education and training of future public health practitioners. The clerkship is designed to promote professional development with opportunities in our local communities and in many foreign countries.
PUBLIC HEALTH (JCPH)		
PBH 500	Foundations of the US Healthcare System	This course compares the organization, structure and function of health care delivery, public health and regulatory systems across national and international settings. Discussion and analysis of the evolution of healthcare delivery since the 18th century will facilitate the exploration of public health history, philosophy and values. The inclusion of interdisciplinary primary documents will allow for the explanation of social, political and economic determinants of health and how they contribute to population health and health inequities. Activities and lecture material will cover the structural elements of healthcare systems including different types of providers. Discussions of their roles and trends in specialization will cover the science of primary, secondary and tertiary prevention in population health, including health promotion and screening. The role of the primary health system stakeholders will be discussed with specific attention paid to the government.
PBH 501	Foundations of Public Health	This course introduces the graduate student to the field of public health through lectures, readings and experiential learning. Skills gained in this course will be useful to those working in public health, healthcare and related fields. We will begin by discussing the history and basic principles of public health and present an overview of a range of public health challenges including infectious disease, chronic disease and violence. The course will prepare students to be effective and accurate academic writers. We will cover the appropriate use of APA format, public health communication and evidence (literature) identification. We will discuss the social determinants of health, health disparities and health equity. The course orients the student to the role of the Public Health Service as well as federal, state, and local public health departments and agencies in the US. The course introduces key national public health initiatives such as Healthy People 2020 and 2030, as well as an overview of public health research, maternal and child health, environmental health, substance use, and violence as a public health issue. This course addresses the links between public health and healthcare, health policy, law and health behavior. Finally, this course introduces the student to the public health literature and exposes the student to public health professionals. The course will address current public health issues as they arise.
PBH 502	Society, Behavior & Environment	Addresses behavioral, social and cultural factors related to individual and population health and health disparities over the life span. Examines research and practice that contribute to the development, administration and evaluation of public health programs and policies that promote and sustain healthy lives and environments for individuals and populations.
PBH 504	Fundamentals of Statistics for Research	Introduces the basics of descriptive and inferential statistics, including sampling and probability, in estimation and statistical decisions as used in public health. Statistical applications include the estimation of confidence intervals; testing statistical hypotheses for population means, proportions, and variances; and use of non-parametric tests. Utilizes Statistical Package for the Social Sciences (SPSS) as a software tool to enter and analyze public health data. Uses Philadelphia regional data from the Public Health Management Corporation as basis for student projects.

PBH 505	Fundamentals of Statistics for Practice	Introduces basics of descriptive and inferential statistics, including sampling, probability, and regression. The course will emphasize interpretation of statistical results, data management and generation of tables and graphs that can inform reports, evaluations, and quality improvement effort in the public health space. Applications include estimation of confidence intervals; testing statistical hypotheses for population means, proportions, and variances; and use of non-parametric tests. Utilizes MS Excel as a software tool to enter and analyze public health data. Uses Philadelphia regional data from the Public Health Management Corporation (PHMC) and CDC National Survey of Family Growth (NSFG) data as basis for student assignments and projects.
PBH 506	Fundamentals of Epidemiology	Introduces epidemiology and its application in public health. Addresses basic epidemiologic terminology and definitions. Present public health problems in terms of magnitude, person time, place, and disease frequency. Examines correlation measures between risk factors and disease outcomes; strengths and weaknesses of standard epidemiologic study designs; and ethical and legal issues related to epidemiologic data. Students calculate basic epidemiology measures, draw inferences from epidemiologic reports, and use information technology to access, evaluate, and interpret public health data.
PBH 507	Fundamentals of Environmental Health	Introduces environmental health sciences. Addresses social, political and economic factors that influence environmental health, including identification of major pollutants, their sources and adverse health effects. Examines general mechanisms of toxicity following environmental exposures, including the impact of such exposures on the health of children. Studies risk assessment of environmental hazards and surveys government regulations and their significance in protecting human health. Specific topics include solid, liquid, and hazardous waste, food safety, water and air pollution, and climate change.
PBH 508	Applied Toxicology & Public Health	Introduces basic concepts of toxicology and their applications in the field of environmental health. Real-world examples of environmental exposures taken from current and historical news reports and their effects on human health will be examined, and potential interventions to mitigate these effects will be discussed using quantitative cost-benefit analyses. Assignments, including the discussion board, exams and the student project, will require students to apply the concepts discussed in the course to design science-based environmental health interventions. The vocabulary and concepts discussed in this course will be useful to students professionally as they develop and implement environmental health interventions for their institutions and patients and personally as they evaluate their own behaviors in pursuit of a healthy lifestyle.
PBH 509	Foundations of Policy & Advocacy	Introduces public health policy and advocacy. Surveys legal structure that supports health and public health policy. Addresses process by which policy is developed and implemented and explores the role of advocacy in this process. Focuses on key public and private stakeholders and examines public health policy initiatives that originate at federal, state, local, and institutional levels. Students analyze policies related to topics such as maternal and child health, obesity, tobacco control, environmental health, climate change preparedness, and delivery of primary care. Emphasizes the role of public health advocacy planning and implementation.

PBH 510	Health Research Methods	This course presents a fundamental framework for health research methods, including critical analysis of public health and health services research literature. Each research method/technique and associated topic areas will be presented through lecture, and reinforced through small group exercises and homework. You will be developing a research proposal this semester. As such, I encourage you to select a research topic area of interest. The skills you gain in proposal writing will serve you in many different contexts in the future. Course will include an overview of the field of health services research as it applies to public health, with the capacity for critical appraisal of the literature and with the ability to design a basic public health/health services research project.
PBH 511	Health Communication	Introduces health communication and relevant theories and models of individual and social change. Topics include planning, implementation, and evaluation of health communication and social marketing campaigns; cultural competency; health literacy; skills in patient care communication; role of communication in health care and public health promotion and disease prevention; media advocacy; mass media and health; entertainment-education; and the similarities and differences between U.S.-based and global health communication. Strategies in health communication and social marketing are reviewed across the levels of the social ecological model, including at the interpersonal, community, organizational, and policy levels.
PBH 512	Qualitative Research Methods	Introduces the philosophy, techniques and uses of the most common forms of qualitative research, with an emphasis on data collection and analysis. Addresses strengths and limitations of qualitative research and ethical issues surrounding its use. Students practice qualitative research methods through participant observation, fieldwork, in-depth interviewing, focus groups, and case studies.
PBH 513	Public Health Law & Ethics	Introduces students to public health law and ethics. Examines key elements of the U.S. legal system that govern and influence public health, including the U.S. Constitution, federal and state laws, administrative law, and judicial decisions. Considers the convergence and influence of ethical principles and law in the context of public health practice, current events and healthcare reform.
PBH 514	Dimensions of Global Health	Explores major issues in global health from the perspective of multiple health disciplines. Emphasizes global/local aspects of public health. Focuses on issues in low- and middle-income countries (LMICs) including global burden of disease; social, structural, and environmental determinants of health; health and socio-economic development; advocacy, policy, trade and health; and health and human rights. Discusses global health from perspectives of non-communicable diseases, the built environment, water and sanitation, nutrition, tobacco, maternal/child health, unintentional and intentional injuries, One Health, and communicable diseases such as HIV and AIDS, tuberculosis and malaria. Examines the roles of colonization, cultural humility, health care delivery systems and global institutions as they relate to worldwide health issues. Students in this class will be responsible for all the material covered during this term. This will include material addressed through activities, both in and out of the classroom, as well as homework, readings, and other assignments. At the end of this course, students will have a broader understanding of and the ability to actively apply the concepts of diversity, equity, and inclusion to world health issues.
PBH 515	Cultural Humility & Cultural Competency in Population Health & Health Services	Explores cultural competency as it applies to health/human service practitioners. Facilitates development of cultural competence and humility in ones self, colleagues, health service and public health work environments. Reviews literature related to diversity and cultural competence as it relates to disparities in health status and access to quality care. Applies students' knowledge and personal reflection to their professional work and develops an individual or community health initiative that reflects cultural humility and competency. Students also develop an action plan that promotes diversity and cultural awareness in professional development and organizational settings.

PBH 516	Health & Human Rights	<p>Focuses on human rights and the public health of Refugees, Immigrants, and the Internally Displaced. Begins with an overview of how universal human rights are described and upheld by international human rights legislation and key global and national organizations. Analyzes unique populations that have been personally affected or whose story accurately demonstrates an aspect of human rights on a global scale. Includes populations with both historic (e.g., native Americans) or current (e.g., Syria and Yemen) perspectives. Utilizes multiple methodologies of case studies, IQ2, debates, 'flipped classroom,' documentaries, videos, photojournalism, team and individual projects and presentations.</p>
PBH 518	Applied Policy & Advocacy	<p>This Applied Policy and Advocacy course was designed for students who would like to continue their careers in health policy. The course focuses on public policy analysis and developing supporting evidence. Students will complete a variety of assignments that deepen their understanding of health policy and prepare them to appraise relevant information critically. The course also focuses on communicating information in different mediums to reach stakeholders, including policymakers. Prerequisite(s): PBH 509</p>
PBH 520	Program Planning, Implementation & Evaluation	<p>Program planning, implementation, and evaluation are essential skills for a public health professional. Students will work in teams of two or three, as a hypothetical public health organization. Working as a team, students will learn to perform various roles in an organization that are associated with program planning, implementation and evaluation, such as: assess and prioritize community needs; identify evidence-based best practices for choosing interventions; develop and practice writing SMART objectives and logic models; understand how to engage and communicate with stakeholders and community members; as well as how to organize a project budget, staffing plan and timeline. In addition, students will learn how to develop implementation and evaluation plans with a focus on summative evaluation (process, impact and outcome evaluation).</p>
PBH 550	Public Health, Clinical Practice, Interprofessional Action	<p>The purpose of clinical-public health training is to ensure students understand their reach as both public health and clinical professionals. Being a competent and transformative provider is not limited to correctly assessing a patient's clinical needs and providing the most appropriate treatment. To be an effective practitioner one must work collaboratively and effectively with an interprofessional team caring for the patient in context. This extends beyond simply understanding the biology of disease - it involves contextualizing care to address all the patients' needs. The course will explore how environmental, psychosocial, and community factors, including historical and systemic discrimination and racism, impact health directly and indirectly, as well as other factors that contribute to overall wellness. This course prepares students to integrate the core tenants of public health into clinical practice so they can effectively address the social determinants of health, health disparities and health equity throughout their careers. Topics include reducing healthcare disparities through clinician-patient partnerships, effective care coordination, interprofessional approaches, and community-clinician partnerships that inform and promote advocacy and action. Additionally, the course will address disparities in primary, secondary and tertiary care, community influences on health, access to healthcare, identification of community needs and community assets, effective communication and cultural competency.</p>
PBH 602	Advanced Social and Behavioral Theory and Intervention	<p>Advanced presentation and analysis of behavioral, social and cultural factors related to individual and population health and health disparities over the life span. Critically examine individual, interpersonal, and community level evidence-based research and practice that contribute to development, administration, and evaluation of public health intervention programs and policies that promote and sustain healthy lives. Focuses heavily on published literature and intensive class discussion Prerequisite(s): PBH 502</p>

PBH 603	Substance Use as a Public Health Issue	This course will provide an overview of the contemporary challenges in addressing substance use as a public health problem. Students will learn about the personal and environmental factors that often contribute to substance use, as well as the downstream consequences, including HIV and hepatitis C. Students will also learn public health strategies to address substance use, including primary prevention and harm reduction. Finally, issues around drug policy at the local, state and federal level will be discussed. While this course will use opioids and the crisis in Philadelphia as the primary case study, other drugs will be touched upon as well. The course combines lecture, interactive class exercises, and group discussion.
PBH 604	Essentials of R for Public Health	This course will cover the fundamentals of data wrangling and visualization using the statistical programming language R. Specifically, it will explore how analytic reports can be made using R Markdown and how packages within the tidyverse (notably dplyr and ggplot2) can be used to work with large, real-world public health datasets.
PBH 605	Advanced Health Statistics	Presents general approaches to multivariate statistical analysis, including elaboration and control of confounding, and key multivariate statistical analysis techniques, i.e., analysis of variance; bivariate linear regression and correlation; multiple linear regression; multiple and partial correlation; and binary and multinomial logistic regression. Analyzes selected datasets, i.e., 2012 Southeastern Pennsylvania Household Health Survey performed by the Public Health Management Corporation, and federal datasets, e.g., NHANES. Prerequisite: PBH 504
PBH 606	Advanced Epidemiology	Builds on PBH 506. Presents examples of epidemiological theory and methods such as: Multivariable analysis, logistic regression, sampling and weighting methods, cohort analysis, confounding, and effect modification. Prerequisite: PBH 506
PBH 607	Infectious Disease Epidemiology	This course utilizes fundamentals of epidemiology and applies them specifically to infectious diseases. Basic principles of infectious disease epidemiology, transmission, prevention and control will be covered along with methods and resources to perform associated disease surveillance, outbreak investigations, and observational epidemiological research. Prerequisite: PBH 506
PBH 609	Geo-Based Information Systems (GIS) Mapping	Introduction to mapping and analyzing health related data using a geographic information system (GIS). Mapping exercises address substantive health care policy and planning issues such as cancer morbidity and mortality, health patterns of uninsured and poor populations, and environmental hazards. Prerequisite: PBH 506 and PBH 504 or PBH 505 (all can be taken concurrently)
PBH 611	LEAP Capstone- Integrative Learning Experience, Part 1	This is part 1 of a 2-semester course. This course will provide LEAP students an important opportunity to demonstrate a holistic understanding of the public health field and the important link between public health, population health and healthcare. Part 1 of this 2 semester course will provide support to LEAP students in the spring term of the program in order to assure they can process, integrate, refine and apply the tools and skills they are acquiring in their MPH core courses, their elective courses and the skills they are developing during their Applied Practice Experience (APE), formally referred to as clerkship. Additionally, this course will provide students an opportunity to demonstrate mastery of programmatic, and individual goal specific, public health competencies. The course will address identification and evaluation of evidence to inform public health practice. Additionally, the course will focus on synthesizing and translating evidence to inform practice and improve communication to the lay community. Students will demonstrate integration of knowledge through the completion of authentic individual and group assignments. Prerequisite(s): Only taken by LEAP students - 2nd Trimester

PBH 612	LEAP Capstone- Integrative Learning Experience, Part 2	<p>This is part 2 of a 2-semester course. This course will provide LEAP students an important opportunity to demonstrate a holistic understanding of the public health field and the important link between public health and healthcare.</p> <p>Part 2 will provide support to LEAP students in the final term of the program to assure they can process, integrate, refine and apply the tools and skills they are acquiring in their MPH core courses, their elective courses and during their Applied Practice Experience (APE), also referred to as clerkship. Additionally, this course will provide students an opportunity to demonstrate mastery of programmatic, and individual goal specific, public health competencies. The course will address leadership skill development, identification and evaluation of evidence to inform public health practice. The course will focus on synthesizing and translating evidence to inform practice and improve communication to the lay community. Students will demonstrate integration of knowledge through the completion of authentic individual and group assignments. A secondary objective of this course is to prepare students for the comprehensive exam.</p> <p>Prerequisite(s): LEAP Students only - 3rd Trimester; PBH 611</p>
PBH 613	LPHT Capstone- Integrative Learning Experience, Part 1	<p>This course provides the support to develop your Capstone Project. The class sessions cover: 1. the scope and requirements of the Capstone Project, 2. the JCPH Capstone Project policies, procedures, and requirements for completing the MPH degree and 3. the project development steps, which include:</p> <p>Developing identifying the key elements / dimensions of the project and structuring that into a background and significance section clearly articulating the public health context; Developing well-defined research question(s)/problem statement and specific aims for the proposed project; Identifying a methodology or process plan that is in alignment with the research question or capstone project respectively. This will include the target population, recruitment approach, data collection, project implementation, analytic strategy and/or other steps; * Identifying the public health competencies expected to be addressed through the Capstone Project.</p> <p>Prerequisite or Corequisite: PBH 510</p>
PBH 614	LPHT Capstone- Integrative Learning Experience, Part 2	<p>This is part 2 of the Capstone-ILE experience (C-ILE). This course will provide LPHT students an important opportunity to demonstrate a holistic understanding of the public health field and the important link between public health, population health and healthcare. This course is designed to support students as they move their individually designed projects (designed, approved and begun in PBH 613) to completion. Students will be expected to draw on all their coursework as they prepare a manuscript, poster and podium presentation describing their work. At the end of PBH 614 students present their C-ILE work to the Jefferson Community and other interested parties.</p> <p>Prerequisite: PBH 613</p>
PBH 615	PA/MPH Capstone-ILE	<p>This course is designed to support PA/MPH students as they move towards the completion of their Capstone-ILE experience (C-ILE). Students will be expected to draw on all their coursework as they prepare an abstract, lay summary, paper, poster and podium presentation describing their work. At the end of PBH 615, PA/MPH students present their C-ILE work to the Jefferson Community and other interested parties.</p>
PBH 651	Clerkship - Applied Practice Experience (C- APE)	<p>The MPH C-APE is a zero credit supervised field experience, which is required by all graduate public health programs accredited by the Council on Education for Public Health (CEPH). It is integral to the preparation of an effective public health practitioner by providing the student with the opportunity to integrate newly acquired public health competencies (see Appendix A). To successfully meet this program requirement, the student must complete a minimum of 120 hours in an approved practice setting and by attending approved community events, and participate in an approved interprofessional activity. There is a \$600 course fee when registering for PBH 651.</p>

PBH 660	Clinical Public Health	Dual degree medical (MD, DO) and Advanced Standing students will attend presentations where they will hear from dual-trained guest speakers about how to integrate their public health training with their clinical training. Additionally, students will be assessed on the below competencies through a series of interactive and independent assignments.
REHABILITATION		
RHAB 401	Clinical Clerkship	This course focuses on the evaluation, diagnosis, and management of people with physical disability, including those with complicated medical problems. The goal of this course is enabling those who complete the elective to describe the scope of the practice of Physical Medicine and Rehabilitation (PM&R) through providing a wide exposure to PM&R. Coequal is the goal of full utilization of all the health team members needed to accomplish the functional goals of the patient. In addition, the student will learn to effectively interact with people with severe disability in a hope-engendering manner and understand the wide ranging effects of life altering functional disability. Under the direct supervision of the attending staff and house staff within the Department of Rehabilitation Medicine, the student actively participates in daily work rounds and teaching rounds, as well as all departmental teaching conferences. A modified version of this course is also offered as a 2-week course
RHAB 425	Research Rehabilitation	Departmental research is scheduled after consultation with the department and approval of a research project. Students may complete up to 12 credits (or 8 weeks) of research in Phase 3. Students wishing to count their research project towards the SI requirement in Phase 3, must receive permission from the SI Director and complete a capstone project.
RHAB 481	Rehabilitation Med Elective	This course which will give students a full-time practical experience in evaluation, diagnosis, and management of people with physical disability, including those with complicated medical problems. In addition, the student will learn to effectively interact with people with severe disability in a hope-engendering manner and understand the wide ranging effects of life altering functional disability. Under the direct supervision of the attending staff and house staff within the Department of Rehabilitation Medicine, the student actively participates in daily work rounds and teaching rounds, as well as all departmental teaching conferences. A modified version of this course is also offered as a 4-week course
REAL ESTATE DEVELOPMENT		
MRE 601	Sustainable Real Estate Development Process	This course provides a step-by-step overview of the stages in environmentally and fiscally sustainable real estate and land-use development, considered from the developer's perspective. Topics range from conceptualization and market analysis; site acquisition, zoning, codes, infrastructure and tax incentives; project planning and design; economic feasibility and financing; the development team; the construction process; plus marketing and financial evaluation. Through cases and lectures presented by leading developers, students investigate the market-driven challenges and benefits of sustainable development with emphasis upon the role of the developer in the creation of an architecturally and ecologically superior built environment.
MRE 602	Intro to Urban & Regional Planning	Tracing the evolution of modern urban and regional planning, its practice and its results, this course will discuss its development within the context of American metropolitan growth and decline. This course will show how practitioners applied elements of design, engineering, law and the social sciences to create the profession of planning. Special emphasis will be placed on how the profession of planning affected minority communities through racial zoning, segregated housing policies, and programs like Urban Renewal, Opportunity Zones, Choice Neighborhoods and HOPE VI.

MRE 603	Introduction to Commercial Development	This course will provide an introductory overview of the commercial real estate development process primarily from the perspective of the equity owner. It concentrates on the identification of important assumptions and trends related to the financial feasibility, marketability, and design of commercial real estate development.
MRE 604	Case Study: Mixed-Use, Commercial, & Health Care Facilities	This course focuses on the challenges and opportunities intrinsic to three distinct, but interconnected and overlapping, development types, with primary focus upon Mixed-Use (a blend of residential commercial, cultural, institutional and/or industrial uses), complemented by Commercial (office and retail), and Health Care facilities of multiple scales (including senior assisted living, not-for-profit neighborhood clinics, and outreach services). Working in a team-based process, students investigate exemplary, "real world" case studies in a series of intensive charrettes that employ Philadelphia as a living laboratory. The Case Study Studio not only affords students the opportunity to visit and dissect actual development sites, but also to assess the financial and social impact of each development type upon the community, as well as evaluate long-term fiscal and environmental outcomes in projects whose scale and density carry far-reaching social, economic, and "quality of life" consequences. Corequisite: MRE 601
MRE 615	Real Estate Finance and Investment	This course introduces concepts, principles and analytical methods used in making sound finance and investment decisions in real estate development. Topics include pro forma analysis, tax analysis, cash flow forecasting, computer modeling, equity valuation, and risk assessment. Using an inductive approach, students gain practical experience applying financial and investment tools in a wide array of property types and development scenarios. Also investigated are capital sources and availability for sustainable planning paradigms, such as Smart Growth, Adaptive Reuse, Brownfield and Infill redevelopment and Transit-Oriented Development (TOD). Undergraduate Perequisite: MRE 601 Graduate Corequisite: MRE 601
MRE 620	Case Study: Urban Revitalization, Historic Neighborhoods & Adaptive Reuse	Course addresses a critical issue facing the contemporary city, namely how to creatively invigorate urban communities-architecturally, environmentally and fiscally. By assessing the macro and microeconomics of neighborhoods, students evaluate the social, political and financial impact of sustainable planning strategies, including Smart Growth, Brownfield and Infill redevelopment, Transit Oriented Development (TOD), New Urbanism "live, work, play," Mixed-use environments, and the Adaptive Reuse of existing buildings. Student teams investigate "real world" projects, using Philadelphia as a living laboratory. The course affords students the opportunity to visit and dissect actual development sites and measure sustainable interventions as a springboard to urban revitalization. Corequisite: MRE 601
MRE 625	Real Estate Law & Ethical Practices	This course examines fundamental legal principles and ethical practices applicable to real estate development. Topics include: contracts, constitutional law, zoning and regulatory aspects of land use, permitting, environmental law and business ethics. Students evaluate the legal issues and ethical implications raised in current case studies and examine the rights, obligations, and liabilities of the major stakeholders in the development process. Undergraduate Prerequisite: MRE 601 Graduate CoRequisite: MRE 601

MRE 630	Market Analysis and Valuation	This course identifies data sources and indicators used to track the demographic, sociological, technological and economic trends that impact the supply and demand for particular building types and sites within specific markets and geographic areas. Linked to market trends, valuation analysis assesses the value of an investment and utilizes income capitalization, cash equivalency, highest and best use concepts of discounted cash flow (DCF), cost approach and direct sales comparison to inform sound development decisions. Through examination of wide-ranging case studies, students apply market analysis and valuation techniques to residential, commercial and office markets, as well as consider their implications for sustainable community prototypes.
MRE 635	Public-Private Partnerships	Increasingly federal, state, and local governments are partnering with for-profit and non-profit development companies, transferring potential risks and rewards of development to the private sector in exchange for financial incentives as return on investment, such as tax abatements, innovative financing, subsidies, and regulatory approvals, among other practices. This course examines the opportunities and challenges of public-private partnerships (PPPs), the techniques employed to encourage growth, and the market and fiscal feasibility of cross-sector collaborations. In problem-based learning exercises students analyze case studies drawn from multiple contexts, with particular emphasis upon sustainable neighborhood redevelopment, rezoning of brownfields and grayfields, infill development, adaptive reuse, as well as affordable and mixed income housing. Working in teams students design and plan an affordable housing development, beginning with site selection in Philadelphia and feasibility studies, tax credit and tax exempt bond financing, community involvement, political considerations, and financial feasibility.
MRE 638	Case Study: Sustainable Affordable Housing	The course provides a broad overview of the affordable housing industry, including a detailed study of the techniques for financing affordable housing. The course also looks at the challenges of integrating sustainable development processes while maintaining affordability. Governmental programs such as the Low Income Housing Tax Credit program and public policies that promote the development and rehabilitation of affordable will be explored. Undergraduate Undergraduate Prerequisite: MRE 601 Graduate Corequisite: MRE 601
MRE 6XX	Real Estate Development Independent Study	Independent Study is a student-centered learning activity for graduate students in Real Estate Development the opportunity to pursue special interests or research not treated in the regular curriculum. The student will conduct in-depth analysis on a topic pertinent in Real Estate Development and craft a final project. The Independent Study course fosters a deeper understanding in a specific area or topic and is focused on research, literature review, or extension/ enhancement of other coursework. The syllabus is personalized to the student's interests and concerns and is modifiable to create an exceptional learning experience. Specific learning goals are to be listed in the student's Independent Study form application. The Independent Study course requires approval by the program director to enroll. All work is conducted under supervision and evaluation of a faculty member. Prerequisite: Students must have completed 12 graduate credits in the program or by permission of the program director.
MRE 640	Capstone Project	The course is the culminating Capstone Project required to graduate with the Masters of Science in Real Estate Development degree from Jefferson University. Students propose a thesis; work with a dedicated advisor to develop the project; orally present the project; and submit their written documentation for final evaluation.
REHABILITATION SCIENCE		

JCRS 740	Design Approaches in Healthcare	This course provides the foundation for incorporating design into practice through the introduction and application of design research strategies, user research methods, problem definition, idea generation, and physical prototyping. During this course, students will attend the first on-campus workshop involving an intensive boot camp incorporating hands-on instruction, training in materials and prototyping, collaborative work with industrial design students, and project presentations.
JCRS 741	New Methods for Assistive Technology Creation	To facilitate leading edge utility of technology in healthcare, the second course (Spring Semester, 8- weeks) provides instruction on the application of 3D printing to address a variety of clinical problems Through software tutorials students will gain comfort with 3D printing technology in preparation for attending the second on-campus workshop involving a 3-day weekend session on campus to work directly with 3D printers.
JCRS 742	Scaling Up & Finding a Market	The third course will build knowledge around manufacturing principles, materials, and methods as well as provide an overview of business models and approaches to commercialization. The goal of this course is to remove common stumbling blocks that often prevent the full distribution of potentially impactful design ideas.
JCRS 743	Quality Improvement through Design	The fourth course (Summer Semester, 8-weeks), will serve as a summative course while introducing additional design strategies that are of particular importance when addressing issues on an organizational scale. Students will build on content from past courses and utilize design research tools to assesses needs within their professional organization, generate ideas, and trial potential solutions with colleagues. During the course, students will participate in the third on-campus workshop involving a 2- day session to present their final projects and highlight their work in the program.
JCRS 750	Foundations in Hand Therapy	This course introduces the student to the specialized field of hand therapy. The principles of hand therapy included are musculoskeletal tissues and pathology, clinical reasoning, hand examination, principles of custom orthotic fabrication, therapeutic exercise, and interventions for pain, edema, and wound management. Common elbow, wrist, and hand disorders (e.g. hand/wrist fractures and tendinopathies) will be discussed to integrate the foundation topics into clinical practice.
JCRS 751	Nerve Injuries of the Hand and Upper Limb	This course emphasizes the anatomy and basic science principles for the cervical spine and major peripheral nerves of the upper limb. Age-related changes and pathophysiology of nerve lacerations and entrapment neuropathies are discussed. Advanced examination skills and interventions, conservative and post-operative, for pathology of the peripheral nervous system are presented.
JCRS 752	Joint Pathology of the Hand and Upper Limb	This course reviews the common pathologies that effect the articulations and surrounding soft tissues, especially tendons and ligaments. Anatomy, biomechanics, and examination principles for each region: shoulder, elbow, wrist, and hand are discussed. Conservative and post-operative therapeutic management for fractures, dislocations, tendon repairs, ligament injuries, and degenerative disorders are presented.
JCRS 753	Diseases That Affect the Hand and Upper Limb	Course content emphasizes the impact of disease on hand function, especially with activities of daily living, vocational activities, and recreational activities. The overview will include pathology, clinical presentation, examination techniques and clinical interventions specific to the hand. Additionally, multisystem involvement associated with mutilated hand injuries is discussed.

JCRS 760	Introduction and Development	This course (Fall Semester, 8 weeks) will introduce the foundation for coaching by presenting core concepts of coaching using seminal evidence. Coaching models and frameworks will be explored, and alignment with students' discipline frames of references will be examined. Key to coaching, students will discuss ways to connect with clients, clarify and get more details, and create meaningful sessions by working in triads to initiate coaching, self-reflect and provide feedback to colleagues. Students will work with faculty and other students using an online platform called Today's One Room School House (TORSH) starting in course one and continue through course four.
JCRS 761	Skills for Evidenced Based Coaching	To further develop coaching skills, this course (Fall Semester, 8 weeks) will continue to apply coaching strategies via authentic coaching sessions and self-reflection to gain insight and experience, and to develop coaching competencies. Relevant literature including but not limited to the literature on posttraumatic growth, resiliency, environment press and readiness for change will be discussed as the basis for supporting health coaching in context.
JCRS 762	Reflection on Coaching Standards	This course, (Spring Semester, 8 weeks) will focus on authentic coaching sessions and the use of a fidelity assessment to evaluate coaching competencies on self and others. Adherence to essential coaching strategies will be evaluated and discussed. Master coaching strategies will be introduced.
JCRS 763	Coaching Evolution and Mentorship	This course (Spring Semester, 8 weeks) will focus on authentic coaching sessions and the use of fidelity assessment to evaluate essential and master coaching strategies. Students will also learn strength based approaches to mentoring and strategies for handling reluctant audiences. Coaching competency will be confirmed via assessment of an authentic coaching sessions. Professional trajectories that outline coaching skills sustainability and advancement will be developed.
SDE INTERDISCIPLINARY COURSES		
SDE 600	Prototyping Int Interfaces I	This course addresses the need by design professionals to prototype interactive systems comprising both hardware and software components, and to assess these solutions based on principles of cognitive and physical human factors. Though iterative prototyping of both screen-based interfaces and tangible interfaces using simple microcontrollers, this class teaches basic programming, integration of electronic sensors and outputs into physical prototypes, and principles of human factors testing for assessment of interactive interfaces.
SDE 700	Prototyping Int Interfaces II	This course is the second in a series addressing the need by design professionals to prototype and assess interactive systems comprising both hardware and software components. Students will refine and build upon skills gained in Prototyping I while exploring algorithms for the capture and manipulation of data to create new modes of interaction in areas such as networked and mobile devices, kinetic sculpture, wearable circuits, and novel electronic tools.
SDE 770	SDE Special Topics	This is an upper-level course designed to take advantage of resident/adjunct/visiting faculty members' expertise or oa special focus wanted by the School for one or two terms. These courses might provide an in-depth treatment of recent advances in subjects of current interest in a given field whose subject matter is not necessarily needed to be offered long term. A specific "topic" may be delivered a maximum of two terms.
SDE 780	SDE Independent Study	This course will allow students to pursue individual areas of interest while working jointly with a faculty member.
SPEECH-LANGUAGE PATHOLOGY		

SLP 601	601Clinical Practicum 1	In this part-time clinical experience, students engage in clinical practice in a community-based setting under the supervision of a certified speech-language pathologist. A weekly clinical seminar is conducted on campus to assist students in integrating information from the classroom and clinic.
SLP 602	Clinical Practicum 2	In this part-time clinical experience, students engage in clinical practice in a community-based setting under the supervision of a certified speech-language pathologist. A weekly clinical seminar is conducted on campus to assist students in integrating information from the classroom and clinic.
SLP 603	Clinical Practicum 3	In this part-time clinical experience, students engage in clinical practice in a community-based setting under the supervision of a certified speech-language pathologist. A weekly clinical seminar is conducted on campus to assist students in integrating information from the classroom and clinic.
SLP 604	Clinical Practicum 4	In this full-time clinical experience, students engage in clinical practice in a community-based setting under the supervision of a certified speech-language pathologist. A weekly clinical seminar is conducted online to assist students in integrating information from the classroom and clinic.
SLP 605	Seminar I - Interprofessional Education	This seminar introduces students to client-centered care within interprofessional teams. Working in small-groups with students representing a variety of disciplines, students will learn about each others' professional roles and responsibilities, and develop the ability to communicate and work effectively as teams as they analyze case material and engage in collaborative problem-solving.
SLP 606	Seminar II - Clinical Practice in Early Intervention and Educational Settings	This seminar will cover regulatory issues related to practice in early intervention and educational settings. Federal and state laws will be covered in the context of speech-language pathology practice.
SLP 607	Seminar III - Clinical Practice in Medical Settings	This course addresses issues related to practice in a range of medically related settings, including billing, reimbursement, and interprofessional practice.
SLP 608	Seminar IV - Evidence Based Practice	In this course, students will critically compare and contrast findings from various studies and apply research findings to clinical practice.
SLP 609	Seminar V	Advanced Professional Issues in Speech-Language Pathology. This seminar will cover topics relevant to the speech-language pathologist entering clinical practice.
SLP 610	Language Disorders of Early Childhood	This course examines the communicative behaviors of infants, toddlers, and preschoolers at risk or diagnosed as having a communication disorder. Students will learn etiologies, characteristics, assessment, and intervention strategies that are appropriate for treating children with language disorders. Simulation experiences will prepare students to work with individuals with language delay and disorders.
SLP 611	Neural Bases of Communication	This course provides an introduction to basic neuroanatomic and neurophysiologic mechanisms as they relate to human communication disorders across the lifespan. The primary focus is on normal processes and how communication is controlled by the central nervous system. This course will prepare students for future courses in the areas of speech, language and swallowing. Case studies related to neurological speech, language and swallowing disorders will be presented.

SLP 612	Speech Sound Disorders in Children	This course provides students with a firm understanding of typical and disordered phonetic and phonological development in children, the nature of nonorganic articulation and phonological disorders, the evaluation process and appropriate intervention strategies for linguistically diverse populations. Simulation experiences will prepare students to work with individuals with articulation and phonological disorders.
SLP 613	Aphasia and Other Acquired Neurological Language Disorders	This course will provide students with the etiologies, characteristics, assessment, and intervention of neurologically based language disorders with an emphasis on aphasia. Simulation experiences will prepare students to work with individuals with aphasia and other neurological language disorders.
SLP 614	Clinical Methods in Speech-Language Pathology	This course will provide students with an introduction to clinical practice. Topics: HIPAA, universal precautions, clinical writing, ethical practice, treatment planning, delivery of evidence-based clinical services. Simulated clinical experiences will prepare students for practice in the community.
SLP 615	Pediatric Feeding and Swallowing Development and Disorders	This course provides students with foundational information on the development of feeding and swallowing. Diagnosis and management of disorders of feeding and swallowing in infancy and childhood will be addressed, including common etiologies and management strategies in a range of settings, including hospitals, homes, and schools. Simulation experiences will prepare students to diagnose and treat individuals with developmental feeding and swallowing disorders.
SLP 616	Research Methods in Speech-Language Pathology	The goal of this course is to prepare students to be critical consumers of research pertaining to normal and disordered communication. It focuses on different types of research, research designs and methods as well as commonly-used statistical methods in the discipline. Students will participate in the design of a group research study which will entail conducting a literature search on a topic and formulating a research question. As part of this course, students will also be introduced to the resources in the Scott Library, the role of the IRB and ethical practices in research.
SLP 617	Language Disorders of Late Childhood and Adolescence	This course examines oral and written language disorders in middle- and late-childhood and the adolescent period. Students will learn etiologies, characteristics, assessment, and intervention strategies that are appropriate for treating children and adolescents with oral and written language disorders. Simulation experiences will prepare students to diagnose and treat individuals with childhood and adolescent language disorders.
SLP 618	Diagnosis and Management of Dysphagia in Adults	This course will provide students with in-depth study of topics related to disorders of swallowing affecting adults. Etiologies, diagnostic procedures, and treatment strategies will be studied. Students will discuss issues related to serving on interprofessional teams and the role of the speech-language pathologist in management of dysphagia in a variety of settings. Simulation experiences will prepare students to diagnose and treat adults with swallowing disorders.
SLP 619	Disorders of Voice and Resonance	This course will utilize lectures, observations, hands-on exercises/experiences, and discussions to provide students with knowledge of the diagnosis and treatment of voice and resonance disorders. Simulation experiences will prepare students to diagnose and treat individuals with those disorders.
SLP 620	Motor Speech Disorders	Students will examine the neurological basis of acquired and congenital motor speech disorders, including dysarthria and apraxia, and accompanying motor speech disorders that result from damage to the central and peripheral nervous systems. Students learn the principles and procedures for the assessment and remediation of motor speech disorders. Simulation experiences will prepare students to diagnose and treat individuals with motor speech disorders.

SLP 621	Advanced Audiology and Aural Rehabilitation	This course will present pathologies of the auditory and related systems and the impact of hearing loss on speech and language development and communication. Principles of aural rehabilitation will be studied. The evaluation and treatment of auditory processing disorders will be addressed as well.
SLP 622	Cognitive Communication Disorders	This course will address the nature, evaluation, and remediation of adults with cognitive- linguistic impairment, with an emphasis on traumatic brain injury and dementia. Simulation experiences will prepare students to diagnose and treat individuals with cognitive communication disorders.
SLP 623	Disorders of Fluency	This course provides an in-depth exploration of the nature of stuttering, and other fluency disorders, current theories of stuttering, contemporary research in the field, and evidence-based treatment of disorders of fluency in children and adults. Simulation experiences will prepare students to diagnose and treat individuals with fluency disorders.
SLP 624	Augmentative and Alternative Communication	This course will provide an in-depth study of communication modalities and the use of augmentative and alternative communication for individuals across the lifespan. Aided and non-aided strategies, low-tech and high-tech options will be explored.
SLP 625	Genetics in Communication Disorders	This course is an overview of genetics and common syndromes that result in communication disorders and/or craniofacial anomalies. Evaluation and treatment strategies will be addressed.
SLP 626	Capstone Portfolio	This is a non-credit bearing experience that allows the student to create an independent portfolio. The portfolio is a culminating project that contains artifacts and reflections that highlight the student's learning outcomes achieved over the past two years and describes the association between academic coursework and clinical experiences. This is a summative assessment tool that encourages student reflection of their learning outcomes. Students will select artifacts that represent their academic and clinical growth toward becoming an entry-level clinician. This portfolio is to be submitted in the final semester of enrollment. It is uploaded on-line and will be reviewed by the student's advisor. Additionally, students will be expected to present and defend their comprehensive "Capstone Portfolio" to their advisor and a faculty member.
STRATEGIC DESIGN MBA		
SDMB 701	Innovative Leadership	This course addresses the skills, concepts, and mind-set that support leadership in complex, innovative organizations. In the context of new business models and planning for uncertainty, topics include self-leadership, critiquing diverse models of leadership, creating vision and strategy, understanding people, managing change, ethical decision making, power and influence, motivation, facilitation of diverse teams, conflict resolution, and organizational culture. The course begins with creative exercises in leadership style self-assessment and extrapolates these results to leadership in new, innovative organizational structures.
SDMB 702	Design Research for Business	This course provides students with the qualitative and quantitative tools they need to find and frame opportunities, construct successful project briefs, and apply the design research method to products, services and experiences by exploring and documenting new research techniques.

SDMB 703	Business Model Development	In this course students explore a customer-centric approach to business models. They apply tools and skills in system and design thinking learned earlier in the program, to analyze and evaluate existing commercial and non-commercial business models, including both successes and failures. Discussion of the various models and patterns emphasizes the radically changing role of IT in organizations. Students explore and evaluate alternative business models in order to find innovative business solutions, and apply their learning to organizations from a variety of industries.
SDMB 704	Metrics I	In this course students integrate principles of financial accounting and managerial accounting, becoming familiar with financial analysis for short and long-term decisions and the use of financial information for control and performance measurement. The financial accounting portion covers interpretation of financial statements and basics of transaction analysis. The managerial accounting component covers cost-volume-profit analysis, job costing, activity based costing, economic value added, capital budgeting, the balanced scorecard, strategic cost analysis and the potential contribution of these advancements to organizational effectiveness.
SDMB 705	Designed Business Systems	This course examines the value-chain from the acquisition and conversion of materials to the distribution of goods and services emphasizing the relationship of operations to the vision, mission and goals of the organization. In addition to learning traditional operational concepts such as operational strategy, process and supply chain management, production and inventory management, and quality management tools such as Six Sigma and TQM, students will utilize principles, tools and techniques associated with design thinking, integrative thinking, sustainability and the management of complexity in order to effectively execute strategy.
SDMB 706	Style and Brand Strategy	In this course students learn to interpret the fundamentals of brand strategy as a tool for strategic execution and as a builder of reliable metrics for profitability. Style, a component of branding, will be analyzed as a competitive differentiator and contributor to firms' value propositions. Students will explore how brand development is built over time, assessing multiple touch points and identifying the fiscal value of brand investment. Students will learn a brand strategy methodology that incorporates style, and culminate with a brand audit project.
SDMB 707	Metrics II	The objective of this course is to enhance student's ability to approach and make financial decisions, blending both theoretical and practical aspects of financial decision-making. The course emphasizes the use of case studies to show students how organizations analyze the financial implications of their decisions with a focus on value creation for all stakeholders.
SDMB 708	Strategic Foresight	This course examines the influence of external factors (social, technological, environmental, economic, political, and cultural) on business strategies and plans. Using tools such as environmental scanning, scenario planning, stakeholder analysis, and competitor analysis, students gain appreciation for organizational and environmental interdependencies and complexity. Strategic decision-making frameworks are examined, with an emphasis on organizational social, ethical, and legal responsibilities, particularly in the context of changing environmental conditions. The imperative for building organizations that are participatory, collaborative and diverse is emphasized.
SDMB 709	Strategic Design Intergration	This course focuses on the intersection between design thinking methodologies and opportunity-finding for strategy development. It covers theory and practice related to innovation, complexity, emergence and principles of systems thinking to address the potential of strategy to drive organizational change and new value propositions. It begins with review of frameworks for strategy development and explores approaches to engaging stakeholders in that development. Students use lifecycle analysis to redesign an existing organizational strategy and develop an actionable and sustainable communication rollout plan.

SDMB 710	New Ventures	This course covers all aspects of the entrepreneurial process, providing students with the theoretical concepts and practical skills for creating successful new ventures. This course addresses the entrepreneurial mind set, creativity and idea generation, assessing entrepreneurial opportunities, conducting feasibility studies and market research, developing marketing plans, financial preparation for new ventures, location and capacity planning, new venture team building, legal issues and risk analysis. The course focuses on the development of an effective business plan for a new venture.
SURFACE IMAGING		
MSSI 500	Surface Imaging Design	Surface Imaging Design will provide students the basic principals of decorative design processes (repeated pattern development and work-flow) and design research methodologies for Surface Imaging. A series of short design projects are introduced with Adobe suites to enhance conceptual, technical and skill development towards surface imaging design.
MSSI 501	Digital Textile Printing	The course consists of theory and practice for digitally printing imageries on textile substrates for wet and dry processing (natural and synthetic fibers) from ideation to printing production on textile substrates. It includes (1) understanding of matrix of fibers and colorants (2) printing requirements and (3) pre and post treatments.
MSSI 502	Hard Surface Digital Printing	Through a series of theories and experiential practices, students will learn to develop the printed production on rigid hard surface substrates with UV cured flatbed digital printing systems. In addition to printing direct colorations with coloring the images, the course also focuses on 2.5-dimensional printing (fundamental of additive printing practice) to introduce printed physical textures to the substrates as well as a basic concept of print-to-shape.
MSSI 503	Digital Printing for Flexible Substrates	Lecture and experiential practice course focuses on development of printed products for roll to roll flexible substrates, including organic and inorganic films, cling films, paper etc. with Eco Solvent, UV and Latex printing systems. This course will allow students to understand the potentials and limitations of digital printing on flexible substrates through layer printing, second surface printing, lamination, and print / cut (decals) mechanism.
MSSI 504	Digital Color Management	The course will introduce a range of essential skills of digital color management through lectures and practices. It covers theory of digital color management, calibration, generating ICC color profiles for the workflow across different devices.
MSSIC\ 505	Printing Technology	This is an online lecture course that focuses on the principles, techniques and chemical processes involved with printing technologies. This course covers printing mechanisms, chemistry, coloration systems and styles for impact, non-impact, additive and subtractive printing. Media preparation, post treatment (fixation) and industrial testing standards are also examined. At the same time, the course also introduces the principal of surface Imaging supply chains that includes design, manufacturing, marketing and product distribution.
MSSI 601	Surface Imaging Design I	This is the first design studio course in the MSSI program that focuses on the individual creative design process utilizing design research methodologies, printing technologies as well as executed crafted control and successful design in surface imaging. Prerequisite: MSSI-500 Surface Imaging Design Foundation or equivalent

MSSI 602	Intro to Material Science for SI	This course will survey materials and materials-related processes associated with surface imaging applications. The science describing a wide range of solid-state materials (e.g., bulk metals and ceramics), polymeric materials (e.g., porous/non-porous substrates) and polymer solutions (e.g., inks, dyes and pigments) will be explained. The structure and properties of modern materials will be related to enhanced performance in the fields of surface imaging. Surface chemistry, including polar and non-polar surface tension and wetting phenomena will also be described from a materials science point-of-view. Some laboratory demonstrations will be included to reinforce student learning of these basic materials science concepts.
MSSI 700	Trans-disciplinary Project I	This is an interdisciplinary course that involves real world industry related projects as well as working collaboration with a variety of disciplines. Example of projects may include: MSSI + corporate sponsor, MSSI + corporate sponsor + MSID + GFE, MSSI + corporate sponsor + MSTE + iMBA, etc.
MSSI 701	Surface Imaging Design II	This advanced studio course emphasizes innovation in surface imaging design and technology. Students will identify current industry movements-from contemporary global surface imaging industries in design, applied engineering and business-to develop innovative surface imaging projects toward future applications and systems. Prerequisite: MSSI 601
MSSI 702	Trans-disciplinary Project II	This is an interdisciplinary course that builds upon the fundamental skills and experiences gained from Transdisciplinary Project I. MSSI-7XXX is an interdisciplinary course that involves real world industry related projects as well as working collaboration with a variety of disciplines. Example of projects may include: MSSI + corporate sponsor, MSSI + corporate sponsor + MSID + GFE, MSSI + corporate sponsor + MSTE + iMBA, etc. It is an elective course for MS in Surface Imaging program. Prerequisite: MSSI 7XX
MSSI 791	Internship for Surface Imaging	This course is one of designated elective courses for MS in Surface Imaging. The course provides real world learning context and experience through internship at the company, cooperation and organization for Surface Imaging industry. Prerequisite: MSSI-601 SI Design I
MSSI 798	Independent Study Surface Imaging	This course will allow students to pursue individual areas of interest while working jointly with a faculty member. Enrollment is subject to the availability and approval of both the program director and faculty member. The student must have 12 or more graduate-level credits, and a prospectus of the proposed independent study must be approved at least one month prior to registration Prerequisite: 12 or more graduate-level credits
MSSI 800	MSI Master Project	Master Project is the final degree project for MSSI. This course consists of (1) the final project based on a concentrated area of SI design, SI applied engineering or SI commerce and (2) a documentation of a business plan to support the project toward an entrepreneurial application in the surface imaging industry. Students are required to represent the project in exhibition format and to conduct an in-person defense of their project to faculty members and outside critics. Prerequisite: MSSI-7XX Surface Imaging Design II This course will be first offered Summer 2016.
SUSTAINABLE DESIGN		

SDN 601	Principals & Methods of Sustainable Design	Sustainability is a cultural phenomenon that is reshaping the way architects, engineers, designers and planners conceive of the built environment. This lecture/seminar course will explore changes in culture over the years that have led to the formation and adoption of contemporary sustainable design practices, technologies and processes. Current aspects of sustainability will be explored including the impact of the LEED rating system, legislation, environmental law, corporate culture evolution, integrated design process, energy modeling and economic impacts of land development. Students will complete a final paper on future directions in sustainable design at the end of the course.
SDN 602	Adaptive and Resilient Design Studio	An introduction to quantitative criteria that define adaptive responses as instrumental characteristics of design based on human comfort, program, climate and site. Investigations will seek an understanding of the reciprocity between competing (and often contradictory) design forces, such as theoretical versus real, dynamic versus static, spatial and numerical, energy gain and loss. An awareness of the function of scientific instruments for measurements and performance assessments on buildings and outdoor spaces on real sites with the goal of achieving human comfort will be explored. Students will propose design interventions in accordance with their experimental data and use simulation tools to assess ultimate performance of the intervention.
SDN 603	Sustainable Building Systems	This course will provide a thorough understanding of of sustainable building systems in order to optimize energy efficiency and minimize environmental pollution while maintaining human comfort resulting in a holistically designed building that is non-polluting and energy efficient. Students will complete a series of case studies and a final project.
SDN 604	Life Cycle Assessment & the Circular Economy	A key requirement to completing a successful sustainable design project is a careful consideration of the environmental and energy performance impacts of construction materials. Students will begin the course by learning how to complete a life cycle analysis for materials as preparation for the design and creation of their own material/construction system. During the project, students will continue to discuss the pros and cons of different materials/construction systems in the context of trying to better understand the tenants of sustainable design. Students will complete a final "construction" as part of the requirements for the course.
SDN 609	Building Info Modeling for SD	This lecture/lab course is divided into two parts. The first part establishes skills in utilizing BIM software as an effective tool for architectural graphic communication. The second part establishes skills for exploring, analyzing, refining, and presenting sustainable design projects.
SDN 613	The Green Program	This collaborative studio course will expose students to the consciousness, processes and metrics necessary to pursue urban regeneration in an effective and meaningful way. Upon arrival in Philadelphia, students will immediately be immersed in several sections of the city where they will use the integrated design methodology to discover, design and visualize urban regeneration solutions. The course will culminate in a final project and presentation.

SDN 619	High Performance Building Envelope	This course explores future possibilities for advanced building envelopes as well as the properties of interior and exterior building materials and their relation to construction methods and detailing. The building envelope will be considered using the following criteria: architectural expression, sustainability, spatial order, performance, and user experience. The goal of these investigations is to develop new building envelope systems that integrate the construction process with structure, materials, climate, energy use, transparency, surface qualities, and aesthetics. Students will participate in an integrated design process leading towards the technical and architectural design of a high performance-building envelope.
SDN 621	Master Studio: Resilient Cities and Communities	Students will take a trans-disciplinary approach to developing a campus scale built environment project that integrates Socio-cultural, Experiential, Ecological and Performative design perspectives into a comprehensive design project. The first half of the semester will focus on the following: A comprehensive site inventory and analysis; comprehensive design requirements; guiding principles and resource benchmarks via the use of case studies. The second half of the semester focuses on the synthesizes of the work completed in the first half through the integrated sustainable design process that features collaborative design charrettes, periodic performance simulations, qualitative evaluations, calculations and costs estimates to insure a high level of performance from all design perspectives.
SDN 622	Master Studio: Living Buildings	This studio will emphasize interdisciplinary teaching and learning as a fundamental core concept of sustainable design. Students will be challenged to work collaboratively on a series of design projects that foster creativity, ingenuity and innovation as key components of effective sustainable design.
SDN 623	Studio Companion: Ecological Systems for Resilient Cities	This studio companion course is about exploration, various points of view and transcending disciplinary boundaries. We will traverse the 'landscape' and examine it through the lens of the various disciplines to understand each perspective and how it shapes our environment and culture. Through readings from leading architects, landscape architects, geographers, and historians, we will dissect the ways in which culture influences human conceptions of landscape and the environment, the effect of humans on the environment and the impact the environment and landscape has on humans.
SDN 624	Studio Companion: Sustainable Systems for Living Buildings	This studio companion course will provide a thorough understanding of sustainable building systems in order to optimize energy efficiency and minimize environmental impact while maintaining human comfort resulting in a holistically designed building that is non-polluting and energy efficient.
SDN 625	Environmental Impact Analysis	This three-phase course will first introduce students to the facets of global environmental change, as well as emerging sustainability paradigms and frameworks. In class discussions and activities will draw on readings by through-leaders and foundational studies in top journals (Economist, Forbes, Scientific American) and peer-reviewed scholarship (Science, Nature, PNAS). Subsequently, in phase II students will learn problem solving approaches in the form of systems thinking modeling and life-cycle analysis, and apply them to several contemporary socioecological challenges. These case-studies will provide students experience in quantitative analysis that can aid in problem-definition and decision-making. The final phase of the course will offer the opportunity to apply these tools and frameworks to their own real-world sustainability challenges, in order to visualize and analyze complexity, and conduct a sustainability audit.

SDN 626	Models & Metrics for Sustainable Organizations	This lecture course builds upon work completed in SDN 625 Environmental Impact Analysis and Systems. Student will bring their problem identifications and research to this course for further development. This course will prepare working professionals to develop business models and use metrics to achieve high level sustainability goals for an organization. Students will use the Business Model Canvas to organize their entrepreneurship and intrapreneurship activities to achieve marketable and scalable sustainability initiatives. Students will learn how to use the Blab framework to develop and achieve the metrics commensurate with Bcorp certification for Sustainable Businesses.
SDN 627	Sustainability Advocacy & Change Management	Master the concepts, tools, and practices needed to advance a sustainability initiative from an initial plan to tangible results. After training in topics that range from project management to intrapreneurship to behavioral economics, students develop a detailed implementation plan and a compelling pitch to gain the support of key stakeholders in their own organization or of the clients in their assigned project.
SDN 628	Capstone in Sustainable Design	This is a culminating studio experience, which is a self-directed and faculty monitored. Students are challenged to synthesize knowledge and skills from their previous coursework in order to create a new sustainable design, and to demonstrate topic mastery. This course is an alternative to the thesis sequence, but still requires research, the creation of a well-reasoned argument, a research booklet, and a final design presentation. The final design must include a quantitative validation as part of the final requirements for graduation.
SDN 702	Energy and Carbon Modeling	Intelligent sustainable design considers the impact of buildings and business processes on global energy fuel types, consumption and carbon flows. The purpose of this course is to understand building energy modeling and enterprise carbon reporting. Students will create a schematic-level energy model and generate a carbon report using commercially available software and industry standard protocols. Student teams will explain, calculate and analyze design exercises, individual and group case studies and a final design project.
SDN 710	Green Design Build	This elective course focuses on actual design and implementation of sustainable materials and technologies on a small scale construction project. Students may plug into a real project under construction or design and create their own structures for a particular site or client. Experts from around the region will be brought in as guests to assist with the process.
SDN 797	Special Topics in Sustainability	Special Topics in Sustainability
SDN 798	Independent Study in Sustainable Design	This course will allow students to pursue individual areas of interest while working jointly with a faculty member.
SDN 900	Thesis in Sustainable Design I	This seminar is the first of a two-term sequence of courses focused on independent research, inquiry design exploration and synthesis. Weekly seminars, interactions with faculty members help to inform student research and lead to the development of a comprehensive thesis project. This course will include class based guidance on the conceptualization, analysis and execution of an individually based thesis defined by methods of inquiry necessary to the interdisciplinary nature of sustainability. Emphasis will be placed on the reciprocal relationship between the research and design processes. Advanced building simulation tools and other quantitative measurements will be integral part of those processes.

SDN 901	Thesis in Sustainable Design II	This seminar is the second of a two-term sequence of courses focused on independent research, inquiry design exploration and synthesis. Weekly seminars, interactions with faculty members help to inform student research and lead to the development of a comprehensive thesis project. This course will include class based guidance on the conceptualization, analysis and execution of an individually based thesis defined by methods of inquiry necessary to the interdisciplinary nature of sustainability. Emphasis will be placed on the reciprocal relationship between the research and design processes. Advanced building simulation tools and other quantitative measurements will be integral part of those processes.
		TAX
TAX 660	Individual Taxation & Planning	This course is a study of federal tax law as it pertains to individuals. It emphasizes the determination of gross income, deductions and credits, tax accounting and timing principles, realization and recognition of gains and losses, and standards of tax practice and ethical concerns. Students gain an awareness of history and tax policy considerations behind various Internal Revenue Code provisions.
TAX 662	Corporation Taxation & Planning	This course will provide students with knowledge concerning organization, capital structure, gross income and deductions, dividends, accumulated earnings tax, personal holding tax and stock redemptions.
TAX 664	Tax Research & Professional Responsibilities	This course enhances the student's ability to identify tax issues, locate and evaluate the legal authority relevant to those issues and effectively communicate, both orally and in written form, the conclusions and recommendations from their research. Electronic (computer) research will be taught in a hands-on setting. Students will gain an awareness of issues in federal tax practice and procedure, including ethical concerns for tax professionals.
TAX 763	Financial Planning	This course will cover all aspects of financial planning including income tax planning, estate tax planning and strategies, gift tax, insurance planning, investment strategies, planning for the elderly and planning for survivors.
TAX 765	Tax of Flow-Through Entities	This course provides an in-depth study of flow-through entities including S corporations, partnerships and limited liability companies. Emphasis will be focused on student's understanding of the tax statutes, court cases and practice techniques related to the concept of "choice of entity." This course creates an awareness of the potential consequences of choosing a particular form of entity. Topics covered include formation, operation, and dissolution of S corporations, partnerships and limited liability companies.
TAX 770	Retirement Planning & Employee Benefits	This course will cover all aspects of entities, types retirement and employee benefits plans. A focus will be placed on plan selection, with an emphasis on the tax advantages and disadvantages of specific types of qualified and nonqualified plans. Plan formation, administration, compliance and termination will be examined. Social Security, Medicare, life insurance and distributions from retirement plans will be examined. Various forms of executive compensation arrangements will be covered such as deferred compensation, golden parachutes, split dollar life insurance and stock option plans.
TAX 771	Adv Individual Taxation & Planning	This course is a continuation of TAX660 - Individual Taxation and is intended as a comprehensive continuation of advanced topics for individuals. In addition to federal taxes, Pennsylvania, New Jersey and Delaware state tax regulations will be covered.

TAX 772	Risk Management & Insurance Planning	This course is a comprehensive examination of risk management and insurance with a focus on its role in financial planning. Topics covered include the risk management process, life insurance, disability insurance, health insurance, long-term care insurance, property and liability insurance, annuities, Social Security, Medicare and Medicaid. Risk identification, risk analysis, loss prevention and legal principles related to insurance will also be covered.
TAX 773	International Taxation	This course focuses on the tax regime for U.S. taxpayers living abroad and the taxation of non-U.S. citizens with income earned or sourced in the United States. This course provides students with a working knowledge of the federal income tax rules applicable to international and cross-border transactions. Topics include tax treaties, foreign earned income exclusion, foreign tax credit, controlled foreign corporations, passive foreign investment companies, effectively connected (business) income, foreign investment in U.S. real estate, export transactions, Subpart F manufacturing rules and transfer pricing.
TAX 778	Current Iss in Taxation & Accounting	This course will update students in various tax and accounting topics. Topics will include new development at the IRS and in areas such as individual taxation, business taxation, financial planning, business tax planning, multi-state tax issues, estate taxation and accounting and auditing pronouncements.
TAX 782	Tax Accounting	This course will review accounting methods and periods, installment method, long-term contracts and changes in accounting methods.
TAX 789	Real Estate Taxation	This course emphasizes the income tax aspects of acquiring, operating and disposing of investment and personal real estate. Detailed consideration of deductions, conventional and creative financing techniques, foreclosures and repossessions, subdivision, sales/leaseback transactions, tax-deferred exchanges, involuntary conversions, and sale of principal residence.
TAX 791	Internship	Internships provide students with an opportunity to apply and further develop the knowledge they have gained in the classroom. Under faculty supervision, students work in salaried positions related to their career goals. While on their assignments, students develop meaningful learning objectives, attend an internship seminar, complete challenging assignments, and write bi-weekly reports analyzing articles in academic journals and practitioner publications.
TAX 793	State & Local Taxation	Emphasis will be placed on individual and corporate tax problem areas in the states of Pennsylvania, New Jersey and Delaware. Gross receipts and sales tax will also be covered.
TAX 794	IRS Tax Procedures	A complete review of audit, collection and appeal procedures conducted by the Internal Revenue Service will be examined by the students.
TAX 795	Estate Planning & Taxation	This course will review mainly the estate and gift tax returns, such as preparation and problem areas. Deductions, income, annuities and taxable transfers will be discussed.
TAX 797	Selected Topics	Content will vary in response to current issues.
TAX 798	Independent Study	This course provides students with an opportunity to pursue areas of interest while working jointly with a faculty member. Subject to availability and approval of both assistant dean for Graduate Business Programs and faculty member.

TAX 799	Financial Planning Capstone	This course highlights the interrelationships among all aspects of the financial planning process with a focus on the application of the knowledge and skills that have been learned while taking the prerequisite courses in the Financial Planning curriculum. Critical thinking, analytical, research and communication skills will be emphasized and will culminate in the formulation of a comprehensive financial plan to be presented to a client.
TEXTILE ENGINEERING & SCIENCE		
TES 901	Preliminary Exam Preparation	Doctoral students will form the doctoral committee and complete formulation of the thesis topic. Literature review and research of the proposed topic. Oral presentation and written submission of thesis proposal will be made to the student's doctoral committee.
TES 902	Thesis I	Doctoral students will conduct original research and gather initial results and prepare their literature review as part of the preparation for the candidacy exam.
TES 903	Dissertation Research I	This course is intended only for Ph.D. students who have achieved Ph.D. candidacy status. Seminal and original research will be conducted with a goal of preparing and defending a doctoral dissertation.
TES 904	Dissertation Research II	Doctoral students continue their research and work towards completing their research and preparing for their dissertation and oral presentation to their committee.
TES 906	Thesis II	Completion and oral presentation of thesis work to the graduate engineering faculty. Submission of the written thesis using the most current Guide For The Preparation Of Doctoral Dissertation And Master's Theses document.
TEXTILE		
TEXT 601	Fiber and Yarn Studies	This course advances the knowledge of fibers and yarns. Yarn-processing systems are covered in detail along with faults that can result from various causes, in either the fiber or the machines. Quality-control procedures are emphasized at each stage of processing, along with methods for analyzing test results. Typical products are discussed from the point of view of type of fiber used and type of yarn structure.
TEXT 602	Sustainable Textiles	This course will examine sustainability efforts in textiles and in the world as it relates to textiles. It will begin with an overview of waste generated in the US, a brief history of recycling in the textile industry, legislation addressing hazardous materials, and delve into organizations involved in creating a more sustainable textile industry and their regulations for compliance. Critical issues in the world involving textiles, such as release of fibers from care of textiles, care of textiles, and life cycle analyses will be studied. Confusion about sustainability and greenwashing will be explored. Textile fibers and potential new fibers and their influence on sustainability will be examined. Fiber, yarn, and fabric formation will be examined in regards to sustainability. Dyeing and finishing processes and the materials used will also be explored. The course will conclude with a study of sustainable textile products and efforts to make those products.
TEXT 603	Integrated Engineering Product Development - Advanced Studies	The AIEPD course introduces the student to product development activities from identifying a market opportunity to the successful delivery of a product to the customer. Throughout the course students will be working in groups to design, develop, prototype and analyze technical, economic and marketing aspects of engineered products. The focus will be on discrete, engineered and physical products using fibrous materials. Opportunity to work on sponsored projects in a multidisciplinary group exists.
TEXT 613	Characterization of Fibrous Materials	A study of the various methods of characterizing fibrous materials including techniques such as microscopy, x-ray diffraction, and differential scanning calorimetry. Students will become familiar with different techniques that can be used to identify and characterize fibrous materials, including fibers, yarns, and fabrics.

TEXT 621	Mechanics of Materials	This course focuses on how different material properties affects the mechanical properties, such as strength and stiffness, of materials.
TEXT 622	Mechanics of Textiles	A study of how different fibrous material properties, such as fiber and yarn size, fabric thickness, fabric construction, fiber cross-sectional shape, and the presence of a finish can alter the properties of textiles.
TEXT 624	Textile Composites	The objectives of this course will be to expose the student to the textile materials and processes used in composite applications and to introduce methods of analyzing and predicting the behavior of the resultant products. Fiber architecture of textiles used for composites is reviewed along with manufacturing processes. Tools for predicting elastic properties will be introduced along with the relationship of elastic properties and geometric considerations.
TEXT 625	Biomaterials Technology	General introduction to the uses of artificial materials in the human body for the purposes of healing, correcting deformities and restoring lost function are presented. Topics include biocompatibility, techniques to minimize corrosion, and specific uses of materials in various tissues and organs.
TEXT 713	Coloration & Finishing Studies	This course starts off with an overview of color and different methods of evaluating color and different influences upon color. Coloration methods and the different dye classes are examined. Methods of finishing of textiles is also discussed.
TEXT 721	Analytical Methods	Statistical process-control theories and methods are discussed, and applications toward optimizing both process and product quality in modern textile operations are considered. The objective of these studies is to develop a process/product control system for the progressive textile plant of today. Another major segment of this course will be the review and employment of various methods of analysis of experimental data. Various techniques, and their advantages and disadvantages, will be considered and studied using textile applications.
TEXT 751	Advanced Woven Structures Product Development	Independent pursuit of goals in the development of woven fabrics is emphasized. The student will complete three projects, with product-development skills enhancement as a primary goal. Each project will require a search of current literature, the use of CAD, selection of equipment, production of a prototype fabric and submission of a technical report. Two of the projects will be selected by the course advisor and the third will be student-selected.
TEXT 752	Advanced Knitted Structures	This course is an in-depth study of weft- and warp-knitting technologies, fabric constructions, and apparel, home furnishing and industrial products/applications/markets. Weft-knit fabric technologies studied include single flat and tubular, double knit, fully fashioned, electronic, etc. Warpknit fabric technologies studied include tricot and raschel, weft inserted, double needle bar, multiaxial, etc. Students are exposed to a variety of weft- and warp-knitting machines, stitch constructions and mechanical and electronic design/ pattern mechanisms. Knit fabric geometry is analyzed on the machine, off the machine and after finishing. The relationship and interactions between the knitting yarn and knitting elements are well established. Knitting productivity and quality factors are emphasized.
TEXT 753	Advanced Nonwovens Structures	Nonwovens have a vast range of physical properties and end-use applications with an exceptionally high performance-to-price ratio. Such remarkable characteristics are possible due to the range of fiber type, bonding methods, and finishing methods possible at an exceptionally low cost. This course is intended to give a broad range of knowledge in nonwoven manufacturing methods cost and end-use applications and consumption. This will be accomplished by lecture, laboratory experiments, literature searches, research, cost analysis, statistical comparisons and modeling.

TEXT 754	Industrial Textiles	home furnishing products. For example, industrial fabrics are used in automotive trim, architectural fabric structure, awnings/outdoor furniture, aerostats, camping products, commercial/institutional interior trim and furnishings, composites, conveyor belts, filtration, geotextile and geomembrane applications, hazardous occupational products, marine products, military products, passive solar systems, sails, tarpaulins, tents, tires and window energy systems. This course is concerned with the study of major industrial fabric applications and constructions. The performance requirements for each major industrial application will be related to the selection of specific fabric constructions. Trends in industrial fibers, yarn structures, fabric constructions, fabric finishing/coating/laminating and in fabrication of industrial products are reviewed for each major application. Each major application/market will be covered, wherein specific requirements and qualified fabric construction will be reviewed. The historical development of each application will be emphasized to demonstrate the impact of new materials/material forms/processing techniques on the dynamic nature of the industrial fabric business.
TEXT 755	Advanced Yarn Studies	This course allows for an independent pursuit of advanced knowledge through a literature search in a selected area of research. Further, the course is structured toward an advanced study of the newer methods of yarn manufacture and the latest developments in processing, computerized control and testing methods. Relationships between yarn properties and product properties are investigated.
TEXT 759	Product Evaluation	The processes for the evaluation of fabrics and products are examined. The use of product assessment as a tool for process and product improvement is emphasized. The complexity of the fiber, yarn, fabric and product-forming systems is such that it requires careful evaluation at each stage of the manufacturing process. A comprehensive understanding of the interrelationships of the fabric and product forming stages as related to their evaluation is developed. Established and innovative methods of evaluation are explored.
TEXT 762	Textile & Apparel Operations Management	This course focuses on the operations and management of textile and apparel firms. Students will learn about the systems needed to successfully manage a textile operation, including quality control.
TEXT 783	Advanced Chemistry of Fibrous Materials	The course is designed to introduce modern methods of instrumental analysis and related technologies to fibrous materials. This course is concerned with the study of spectroscopic methods such as: UV-Spectroscopy, FTIR, NMR, EPR, GC, HPLC, microscopy, DSC and some microbiological methods, etc., applied to material science and technology. In addition, this course will introduce students to related fields of fibrous materials and polymers such as gels and sprays, and the technology of production of delivery systems for drugs and medications. Introduction to adhesion processes and superabsorbents (e.g., diapers, incontinence products and biotextiles) will also be covered. Lectures are complemented with laboratory work and seminars.
TEXT 790	Quality Management	Quality has emerged as a formal management function. No longer restricted to manufacturing and operations areas, it now includes the design, purchasing and marketing processes. Through lecture, discussion and experiential activities, this course examines quality theory and practice ? how a more sophisticated understanding of quality can lead to a strategic approach to utility management which is necessary to compete in today?s world marketplace. Factors required for creating and maintaining a corporation?s strategic and competitive edge are thoroughly analyzed.
TEXT 791	Internship	Student completes an internship opportunity according to regulations set by Career Services
TEXT 797	Selected Topics	Selected Topics Content will vary in response to current issues.

TEXT 798	Independent Study	Students may select an independent project or research topic with the approval of the program director.
TEXT 940	Research Thesis	In consultation with the thesis advisor, the student will select an area for concentrated study. The elements of the study will include, but not be limited to, literature searches, experimental design, research, thesis preparation (using the most current University Guide For The Preparation Of Doctoral Dissertation And Master's Theses document) and oral thesis presentation. This project is the culmination of a rigorous preparation in one or more areas of specialization and leads to the establishment of expertise in a chosen field. (20 hours minimum per week)
TEXT 941	Research Thesis	In consultation with the thesis advisor, the student will select an area for concentrated study. The elements of the study will include, but not be limited to, literature searches, experimental design, research, thesis preparation (using the most current University Guide For The Preparation Of Doctoral Dissertation And Master's Theses document) and oral thesis presentation. This project is the culmination of a rigorous preparation in one or more areas of specialization and leads to the establishment of expertise in a chosen field. (20 hours minimum per week)
TEXTILE DESIGN		
TXD 600	Nonwovens Fabrication & Design	Experimentation in the methods of nonwoven web formation, bonding, end use and expanded market potential for nonwovens are investigated. In the design studio, students will conduct market research while concurrently developing design concepts through hands on laboratory experience. Each student will create a collection of samples with a specified intention exercising knowledge of fiber and fabrication properties, aesthetic qualities and performance characteristics.
TXD 615	Design Studio I-A	Focuses on design research as an essential beginning for textile design studio work. Students in all concentrations will work on common projects and, toward the end of the semester, take their research work into design work specific to their concentration.
TXD 616	Design Studio I-B	This initial course will be delivered through lecture/studio sessions and will ensure that the student gains increasingly advanced knowledge of the technical/design aspects of knit, print or weave design. Within TXD616 and TXD617, projects will be devised to integrate the knowledge and practice gained through design and technical courses, with the development of individual creative design work in the chosen concentration (knit, weave or print).
TXD 617	Design Studio I-C	This initial course will be delivered through lecture/studio sessions and will ensure that the student gains increasingly advanced knowledge of the technical/design aspects of knit, print or weave design. Within TXD616 and TXD617, projects will be devised to integrate the knowledge and practice gained through design and technical courses, with the development of individual creative design work in the chosen concentration (knit, weave or print).
TXD 625	Seminar	Weekly seminars will be arranged to which visiting speakers will be invited to give presentations on topics covering the national and international perspectives of marketing, technology and design in textile and related activities. Student participation will be expected during these seminars.

TXD 665	Design Management	The aim of this course is to create an awareness of the factors involved in the process of innovation and design, and the importance of establishing a policy and strategy, which will ensure that the design process is effectively promoted and managed to assist in the achievement of organizational goals. At the end of the course, students will be able to: (a) relate the process of design to corporate and product strategy; (b) describe the nature of the tasks undertaken by industrial innovators and designers; (c) prepare a brief for a design project; (d) monitor and evaluate the progress of a design project. They will also become aware of (a) the contribution made to the design process by systematic techniques such as value analysis and by specialist support staff; (b) the factors affecting creativity and innovation; (c) the link between product and manufacturing system design; (d) the legal protections offered to designers.
TXD 742	Design Studio II-A	Studio work involving advanced-level technical/creative projects in the chosen design concentration (as in Design Studio I), and the opportunity for interdisciplinary work encouraging knit/print, weave/print or weave/knit coordination, will be carried out in the first part of the semester. Student design work at this point should progress from assigned projects to independent, student-directed work.
TXD 743	Design Studio II-B	Studio work involving advanced-level technical/creative projects in the chosen design concentration (as in Design Studio I), and the opportunity for interdisciplinary work encouraging knit/print, weave/print or weave/knit coordination, will be carried out in the first part of the semester. Student design work at this point should progress from assigned projects to independent, student-directed work.
TXD 744	Design Studio II-C	Studio work involving advanced-level technical/creative projects in the chosen design concentration (as in Design Studio I), and the opportunity for interdisciplinary work encouraging knit/print, weave/print or weave/knit coordination, will be carried out in the first part of the semester. Student design work at this point should progress from assigned projects to independent, student-directed work.
TXD 749	Weave Technology II	The variations, functions, auxiliary devices and design characteristics of dobby and Jacquard looms and the equipment used to support the weaving process will be studied. Calculations relating to production and materials will be considered, along with the accurate analysis of fabrics for weight and cover. Consideration will be given to size, texture, fiber type, weave and other fabric parameters. Advanced multilayered weaves will also be studied.
TXD 750	Knitting Technology II	A further investigation into the construction, design and production of both weft- and warp-knitted fabrics. Lectures will be complemented with lab work involving the design, production and analysis of knit fabric upon power-knitting equipment.
TXD 756	Advanced Jacquard	The design and production of Jacquard fabrics will be studied. Students analyze designs and produce complex fabrics on commercial equipment using computerized design and production systems.

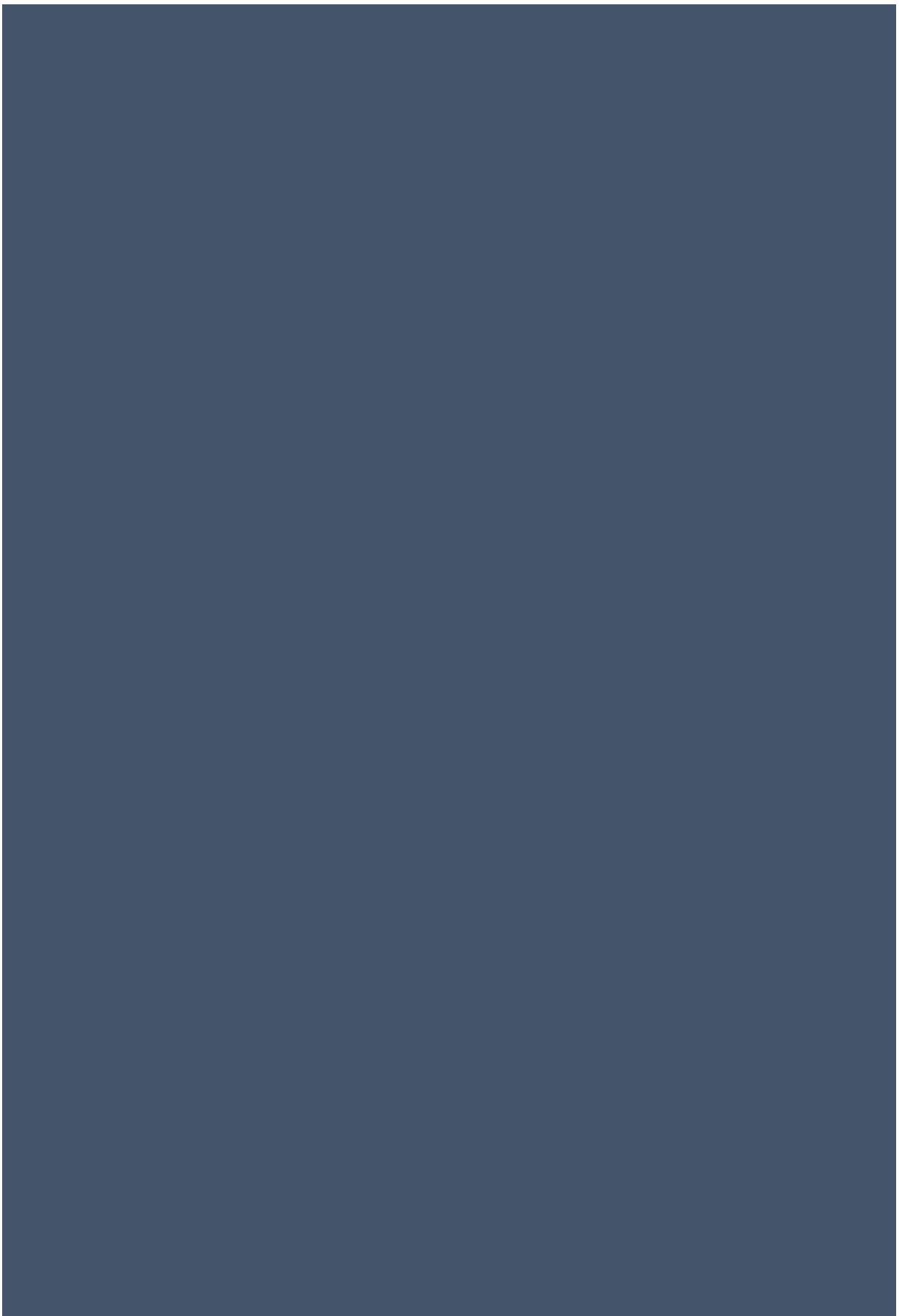
TXD 772	Design Studio III-A	(a) Project The major project worked on independently by students during this final semester will be chosen to show the student's range of creative and technical ability. It will be concerned with a specialized area within their design concentration. Each project will be required to encompass: (1) design ideas and extensive sketchbook development; (2) market research and technical notebooks; (3) print Croquis and/or fabrics in sample form, production fabrics, computer-aided designs and final product rendered designs. (b) Final Exhibit The student will be expected to mount a personal design exhibit showing the range of his/her abilities in either knit, weave or print design. The work will be professionally presented and displayed for judging by a panel of design faculty. An important outcome of this exhibit will be the opportunity for key industrial people to view the work, possibly resulting in career opportunities. A secondary outcome will be its inspirational impact on undergraduate design students within the University.
TXD 773	Design Studio III-B	(a) Project The major project worked on independently by students during this final semester will be chosen to show the student's range of creative and technical ability. It will be concerned with a specialized area within their design concentration. Each project will be required to encompass: (1) design ideas and extensive sketchbook development; (2) market research and technical notebooks; (3) print Croquis and/or fabrics in sample form, production fabrics, computer-aided designs and final product rendered designs. (b) Final Exhibit The student will be expected to mount a personal design exhibit showing the range of his/her abilities in either knit, weave or print design. The work will be professionally presented and displayed for judging by a panel of design faculty. An important outcome of this exhibit will be the opportunity for key industrial people to view the work, possibly resulting in career opportunities. A secondary outcome will be its inspirational impact on undergraduate design students within the University.
TXD 774	Design Studio III-C	(a) Project The major project worked on independently by students during this final semester will be chosen to show the student's range of creative and technical ability. It will be concerned with a specialized area within their design concentration. Each project will be required to encompass: (1) design ideas and extensive sketchbook development; (2) market research and technical notebooks; (3) print Croquis and/or fabrics in sample form, production fabrics, computer-aided designs and final product rendered designs. (b) Final Exhibit The student will be expected to mount a personal design exhibit showing the range of his/her abilities in either knit, weave or print design. The work will be professionally presented and displayed for judging by a panel of design faculty. An important outcome of this exhibit will be the opportunity for key industrial people to view the work, possibly resulting in career opportunities. A secondary outcome will be its inspirational impact on undergraduate design students within the University.
TXD 776	Textile Printing Technology	A specialized and practical course in the principles, techniques and chemical processes involved in the printing of textiles. The chemistry and use of different dye classes and pigment systems; application printing; discharge, burnout and other styles; and the influence of thickeners, cloth preparation and fixation processes on quality and colorfastness are examined.
TXD 777	Advanced Computer-Aided Design	This course focuses on both the conceptual and technical aspects of digital portfolio presentation for the textile designer. Students will use interactive media to convey design concepts, document processes, and demonstrate end use of their textile collections. Course projects provide an in-depth exploration of Adobe Photoshop and InDesign. Students must have a clear understanding of these softwares before enrolling in this course.

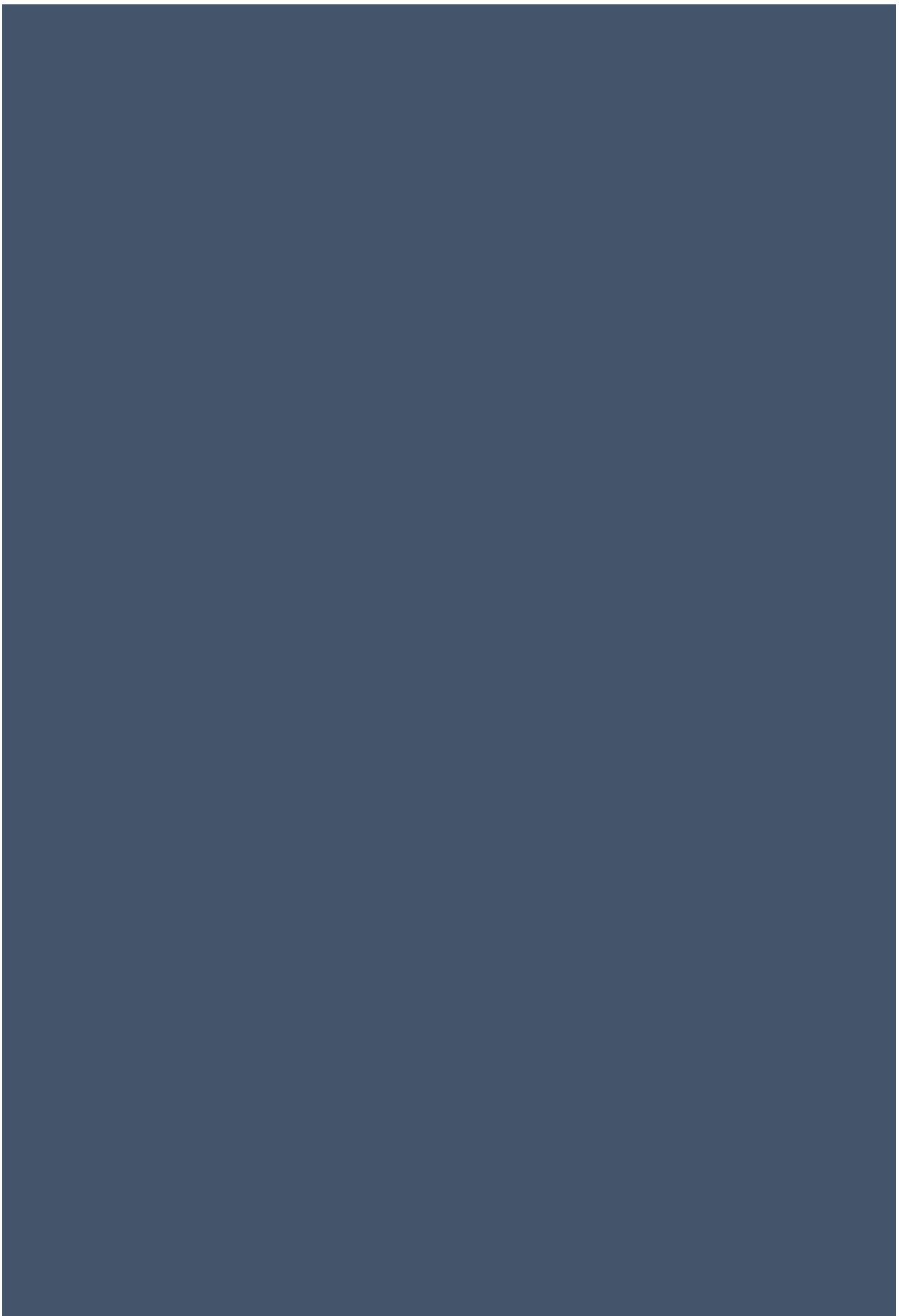
TXD 780	Avd Drawn: Materials & Technq	This course is designed to further develop the design student's drawing abilities and creative thought process, while encouraging conceptual development and a deeper understanding of contemporary issues in art and design. This course will provide an in-depth exploration of line, color and materials using a variety of drawing tools while introducing a more conceptual approach to drawing. Students will participate in off-campus trips to galleries and museums.
TXD 791S	Internship	Internships provide students with an opportunity to apply and further develop the knowledge they have gained in the classroom. Under faculty supervision, students work in salaried positions related to their career goals. While on their assignments, students develop meaningful learning objectives, attend an internship seminar, complete challenging assignments and write bi-weekly reports analyzing articles in academic journals and practitioner publications.
TXD 798	Independent Study	Students may select an independent project or research topic with the approval of the dean of the School of Engineering & Textiles.
TXD 975	Thesis	The design work encompassed through the major project/collection will be submitted in thesis form, two copies of which remain at the University. The written thesis contains research material relative to design inspiration, historical and contemporary precedents and contexts, technical development and production processes in both visual and written form. This course assists final semester students in the production of their thesis document using the most current Thomas Jefferson University Guide For the Preparation of Doctoral Dissertation and Masters Theses document. In addition to the bound thesis, other media presentations of their final project will be explored. Pre-requisite: students must successfully pass a Pre-Thesis Review during their penultimate semester for approval to enter thesis.
TXD 993	European Textile Print	A two-week study tour in the textile printing areas of France, Switzerland and Northern Italy introduces textile majors to the expertise of important European printers, screen engravers and studios in the areas of printed textile design, style, color and printing technology. Visits to the two important French historic textile museums and other related textile plants are also included.
TEXTILE FOUNDATION		
TXF 501	Foundation Fiber & Yarn Studies	This course introduces the basic knowledge of fiber and yarn technology. Included are the proper use of fiber/yarn terms and definitions, the construction parameters of the various fiber and yarn types and detailed analysis of performance properties for each. This information is then used in the proper selection of fibers and yarns for various fabrics and ultimately for various end-use textile products in apparel, household and industrial applications. This is a foundation course that does not count for credit toward the graduate degree.
TXF 503	History of Textiles & Costumes	A multi-faceted survey of textiles and costumes from ancient cultures to the present, technical- and visual-design aspects of the textile arts, the influence of trade on design trends, styles in period costume and the sociological implications of dress are all incorporated. This is a foundation course that does not count for credit towards the graduate degree.
TXF 505	Design I	This foundation design course explores the basic elements and principles of 2D and 3D form and their application in the design process. Line, shape, mass, space, texture and gray value are introduced as fundamental and interrelated components necessary in structuring solutions to problems in design. Projects are introduced which encourage students to express ideas in a visual/tactile context, while exploring the interaction of ideas and materials.

TXF 506	Design II	Color is introduced in this foundation design course with an emphasis placed on its practical application in the design process. Projects done by students, using a variety of media, will explore the interaction of color in design with both formal, biophysical and psychological implications and goals. This is a foundation course that does not count for credit towards the graduate degree.
TXF 510	Intro to Digital Imaging	This course focuses on increasing the student's individual level of computer literacy through the exploration of the basic structure of the operating system, general Internet skills and the fundamentals of 2D image making and web-design programs. Course projects provide hands-on experience with Adobe Photoshop, Adobe Illustrator and web design software. This is a foundation course that does not count for credit towards the graduate degree.
TXF 511	Knit Technology I	The understanding of both weft- and warp-knit fabrics through an investigation of knit construction, machinery, principles and knit fabric analysis. Lectures are complemented with a series of lab exercises on hand-flat equipment and fabric-analysis projects designed to fully acquaint the student with the principles of knit-fabric design and production.
TXF 512	Knit Design Studio I	Students will learn through individual development how to create a range of texture and color effects within knit design. Independent needle selection and the use of the presser foot will be explored within design areas involving Jacquard, held-stitch and tuck-stitch structures. Design ideas will be developed through to swatch/sketch proposals suitable for sweater production.
TXF 513	Knit Design Studio II	A knit design studio elective for Textile or Fashion majors specializing in the knit-design area. Original design ideas will be developed through swatch/sketch presentations. Garment ideas will be developed through technical sketches and specifications into completed sweaters.
TXF 514	Print Design Studio I	Techniques, materials, tools and basic information needed for the design on paper of printed fabrics for the apparel and home furnishing fields are studied. Hands on approaches with gouache and watercolor are used to prepare colorway and repeats. Students prepare a portfolio and learn to keep a sketchbook. A brief introduction to printing methods is included
TXF 515	Print Design Studio II	This course focuses on creative use of CAD in surface patterning, which integrates with hands-on design applications that students acquired in PRINT-303 Print Design I. Digital workflow, which includes scanning croquis, designing pattern on CAD, digital color matching and color ways will be introduced. At the same time, strong emphasis is placed on making croquis, which develop from drawings and paintings in the sketchbook. Students will create printed textile designs and patterns for Jacquard designs on paper with digital printers for apparel and home furnishing fields. Throughout the semester, sketchbook study will also be required to document the working process, as well as drawings and paintings.
TXF 516	Dyeing and Finishing	This course presents an overview of the wet processing of fibers, yarns and fabrics. Included are the preparation, dyeing and finishing of textiles. Some emphasis is placed on the chemistry and technology involved in these operations. Dyes are studied by their method of application and the primary substrates to which they are applied. Chemical, thermal and mechanical processes are discussed for both preparation and finishing of fabrics

TXF 517	Weave Technology I	The structures and analysis of woven fabrics will be studied utilizing CAD, pick outs and laboratory assignments on industrial equipment. Weave structures will include plain, twills and satins (with their derivatives), color effects, textural effects (cords, piques, etc.) and pile weaves. Fabric will be mathematically analyzed for weight, yarn size, fabric count and yarn crimp to specify fabric structure. Necessary loom controls (draw, chains and reed plans) will be used to relate lectures and laboratory work on dobby looms.
TXF 518	Weave Design Studio I	This course focuses on the effects and interactions that yarn, color, texture and structure play in woven design. Working with multi-harness floor looms and dobby looms, students create warps and chains, and weave prototype cloth for various end uses.
TXF 519	Weave Design Studio II	The study of elements of woven design is brought to the problems of multi-layered cloth, compound weaves, block designs and other advanced structures. Students use several CAD programs in conjunction with AVL compu-dobbies to increase their design capabilities. Multi-harness floor looms and dobby looms are also used to develop cloth from concept to actuality.
TXF 542	Color, Dyeing and Finishing	This lecture course presents an overview of color science and wet processing of fibers, yarns and fabrics. Included are the preparation, dyeing and finishing of textiles. Some emphasis is placed on the chemistry and technology involved in these operations. Dyes are studied by their method of application and the primary substrates to which they are applied. Chemical, thermal and mechanical processes are discussed for both preparation and finishing of fabrics. This course may not be taken for credit by anyone who previously received credit for TEXTCHM 242, TXF 516 or C501. Prerequisite: CHEM 101 or CHEM 103
TXF 542L	Color, Dyeing & Finishing Lab	This hands-on laboratory-based course highlights concepts covered in Color, Dyeing and Finishing Lecture. Emphasis is placed on developing laboratory skills and to reinforce the concepts covered in the weekly lecture throughout the term. Experiments include color measurement, color mixing, dyeing of various classes and finishing using both chemical & mechanical techniques. This course may not be taken for credit by anyone who previously received credit for TEXTCHM 242, TXF 516 or C501. Prerequisite: CHEM 101 or CHEM 103
URBAN DESIGN -Future Cities		
MUD 600	Master Studio: Towards Sustainable and Smart Cities	This introductory urban design studio will introduce fundamental concepts and methods of urban design, and explore sustainable and smart cities through four different scales: infrastructure, mobility, public space, and building. With the support of the other two courses on urban technology (“Advanced GIS - Urban Spatial Analytics” and “Modeling Urban Environmental Performance”), students will be able to use a variety of advanced analytical and simulation tools to “intelligently” design future neighborhoods and cities that are vibrant, healthy, and resilient. Specifically, various social and environmental indicators will be assessed and designed, such as accessibility to public transportation, amenities and green spaces, walkability, views, street vitality, daylight hours, and renewable energy potential. The studio will focus on the development of major metropolitan areas, and involve travel to large American cities, such as New York, Chicago, Los Angeles, Houston, and Philadelphia. Students will also have opportunities to engage with local practitioners, researcher and policymakers.

MUD 601	Modeling Urban Environmental Performance	This course aims to introduce principles, methods and applications of urban environmental performance simulations, and develop computational design workflows to integrate urban data exploration and environmental performance. The techniques introduced in this course are applicable at both architectural and urban scales; at its core, this course is about drawing with data, measuring environmental performance, and visualization for decision-making. Specifically, the simulation for urban environmental performance will include building energy use intensity and affiliated carbon emissions, solar energy potential, daylight, outdoor thermal comfort, visibility, neighborhood walkability, and access to green spaces and public transportation. The tools for iterative analytical explorations of the design and performance outputs will be also introduced, to allow students to not only determine the schemes with the optimum performance satisfying individual parameters, but also to explore the nuances of balancing trade-offs.
MUD 602	History and Theory of Urban Design	This course analyzes major movements and theoretical constructs that have dominated urban design and the making of cities from pre-industrial periods to contemporary cities and megacities. Focus upon societal and environmental aspects, political and economic systems, scientific and technological changes, philosophical and ideological positions form the backdrop to an examination of the city as artifact and to decoding the meanings embedded within the urban fabric.
MUD xxx	Master Studio: Future Cities	Against the background of climate change and rapid urbanization, this research-based design studio aims to propose a Zero-Carbon City that is a resilient, compact, and car-free community, fully powered by renewable energy. Mass timber structural systems at both the building and urban scales will also be explored, in order to transform the city from a source of CO2 into a carbon sink. Zero-Carbon City also proposes a closer, healthier, and more sustainable relationship between the city, people and nature.
MUD xxx	Architectural Research Methods	This seminar is focused on understanding independent research, inquiry, analysis, design exploration and synthesis in architecture. Different approaches to research, hypothesis testing, design process, and systems for design will be presented and discussed. This course is structured around weekly seminars and workshops and interactions with faculty members to guide student research and lead to the development of a comprehensive thesis project. Students will be challenged to develop and prepare their research proposals for their thesis project.
MUD xxx	Urban Design Masters Thesis	In this culminating thesis studio course, students will work under the guidance of a faculty advisor on an urban design research project that will focus on the continuation and completion of the thesis proposal developed in the previous semester while demonstrating in-depth research ability at a graduate level. Students will be required to focus on specific details and features of their project. If agreed to by the program director, students will present their final project in a public forum and generate a final "book" (using the most current Jefferson Guide for The Preparation Of Doctoral Dissertation And Master's Theses document) that includes all of the work completed during the graduate thesis project sequence. For a design project, students will be required to present their project research results as part of the final requirements for graduation. Prerequisites: MSARC 631 (MUD xxx) and consent of faculty advisor required.
MUD 615	Advanced GIS: Urban Spatial Analytics I	This advanced GIS course will cover topics in geospatial technology as related to the allied design disciplines: landscape architecture, architecture, urban design, planning and geodesign. The course prepares students to apply GIS within practical design processes such as site preparation and analysis; modeling terrains and hydrologic processes; integration of sustainable design criteria; and modeling the built environment in 3D. While this course will cover a broad suite of tools within the Esri ArcGIS platform, it will place heavy emphasis on raster-based GIS processes. This course will also feature workshops and/or presentations by professionals who use geospatial technology in various design disciplines. Cross-listed with GEOD-615 and cross-leveled with LARC-515









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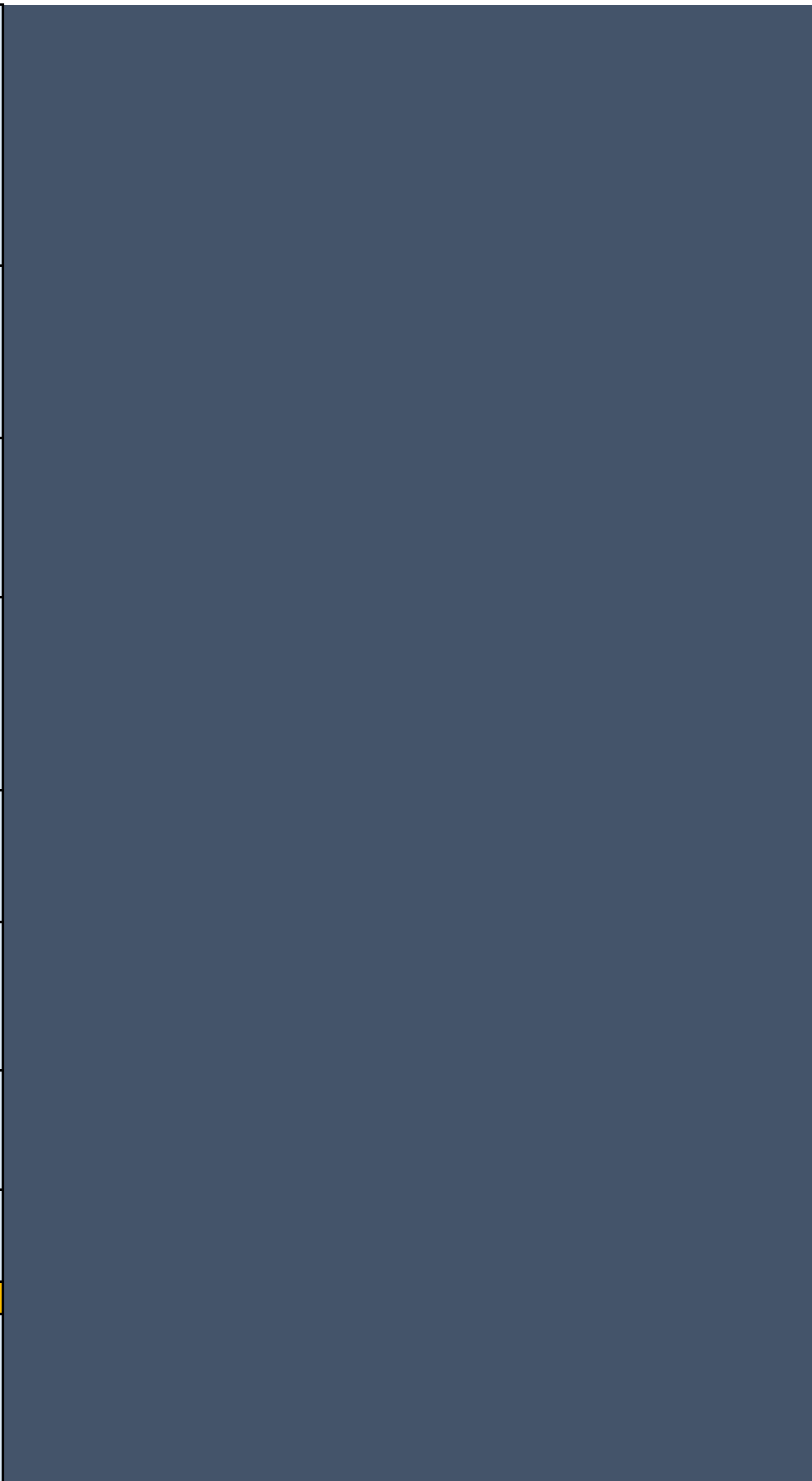
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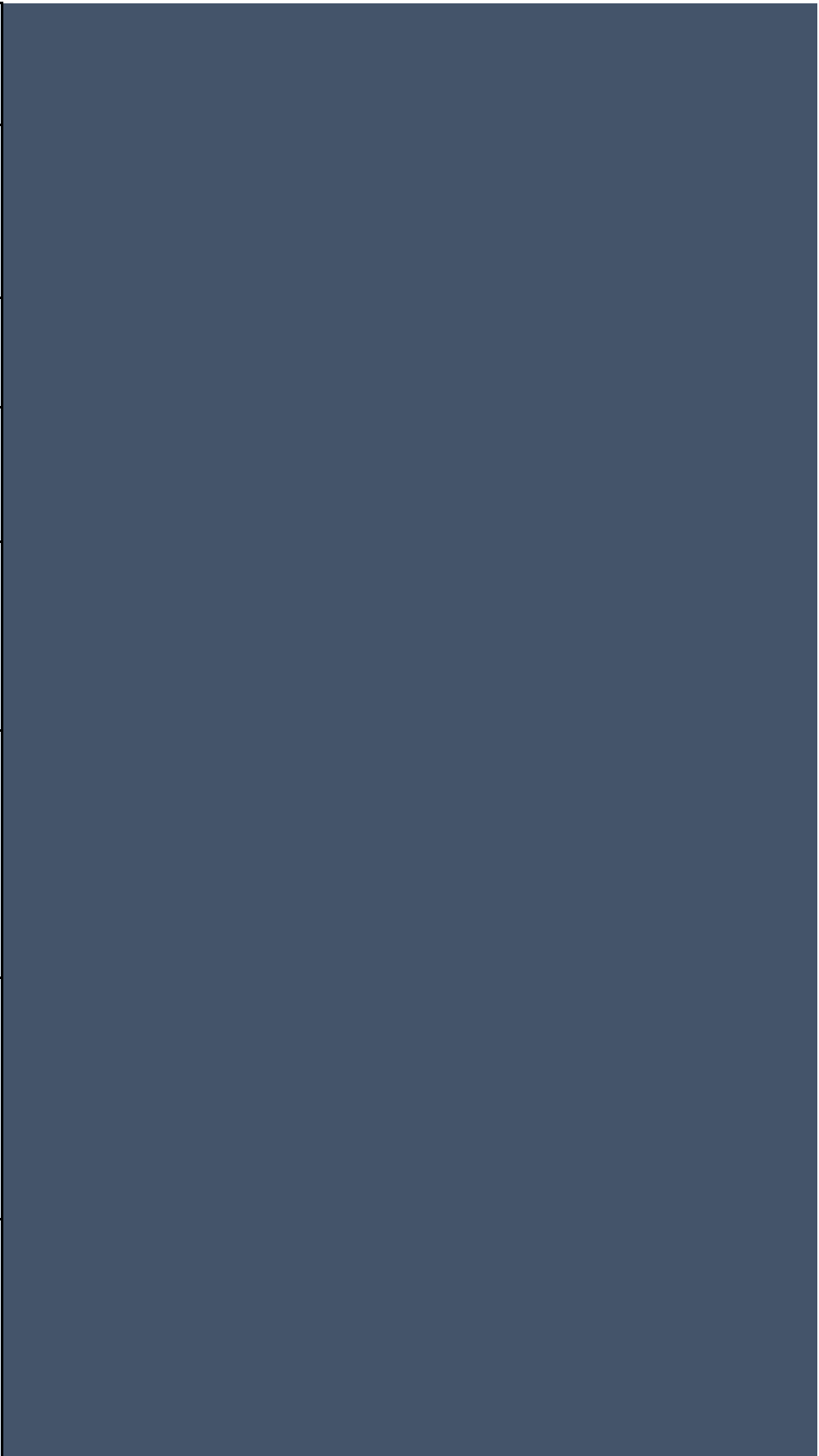
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Schedule Types: By Appointment - 1 student, Lecture, Lecture/Studio Combination, Studio

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Credit Hours: 3.000 Schedule Types: Lecture/Lab
Credit Hours: 3.000 Schedule Types: Lecture/Lab
Credit Hours: 1.000 Schedule Types: Lecture/Lab
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 2.000 Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture,
Seminar

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types:
Independent Study,
Lecture, Seminar

Credit Hours: 3.000
Schedule Types: Didactic

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture
Credit Hours: 1.000
Schedule Types:
Lecture/Lab

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Seminar

Credit Hours: 1.000
Schedule Types: Seminar

Credit Hours: 1.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Didactic

Credit Hours: 1.000
Schedule Types: Lecture,
Seminar

Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Clinical, Independent Study, Practicum
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 2.000 Schedule Types: On-Line
Credit Hours: 2.000 Schedule Types: On-Line
Credit Hours: 3.000 Schedule Types: Lab
Credit Hours: 3.000 Schedule Types: Lab
Credit Hours: 3.000 Schedule Types: Research
Credit Hours: 1.000 - 30.000 Schedule Types: Lab
Credit Hours: 1.000 - 20.000 Schedule Types: Research
Credit Hours: 1.000 - 30.000 Schedule Types: Lab

Credit Hours: 1.000 -
10.000
Schedule Types: Reseach

Credit Hours: 1.000 -
20.000
Schedule Types: Reseach



Credit Hours: 3.000
Schedule Types:
Internship

Credit Hours:1.000
Schedule Types:
Internship

Credit Hours: 0.500
Schedule Types:
Internship



Credit Hours: 3.000

Credit Hours: 3.000
Credit Hours: 3.000
Credit Hours: 3.000
Credit Hours: 1.500 Schedule Types: Lecture/Studio Combination
Credit Hours: 1.500 Schedule Types: Studio
Credit Hours: 4.000
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Hybrid

Credit Hours: 1.000
Schedule Types: Hybrid

Credit Hours: 1.000
Schedule Types: Hybrid

Credit Hours: 1.000
Schedule Types: Hybrid

Credit Hours: 1.000

Credit Hours: 3.000

Credit Hours: 4.000

Credit Hours: 3.000

Credit Hours: 6.000

Credit Hours: 3.000

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

3.000 Credit hours
Schedule Types: Lecture,
On-Line

3.000 Credit hours
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Hybrid,
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 2.000
Schedule Types: Online

Credit Hours: 2.000

Schedule Types: Online

Credit Hours: 2.000

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit hours: 3.000
Schedule Types: On-Line

Credit hours: 3.000
Schedule Types: On-Line

Credit hours: 3.000
Schedule Types: On-Line

Credit hours: 3.000
Schedule Types: On-Line

Credit hours: 3.000
Schedule Types: On-Line

Credit hours: 3.000
Schedule Types: On-Line

Credit hours: 3.000
Schedule Types: On-Line



Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 4.000
Schedule type: Seminar

Credit Hours: 3.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule type: Seminar

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Lecture/Lab,
Lecture/Studio
Combination

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types: Lecture,
Seminar

Credit Hours: 2.000
Schedule Types: Lecture,
Seminar

Credit Hours: 2.000
Schedule Types: Exam,
Lecture, Lecture/On-

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 1.000 Schedule Types: Clinical, Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Clinical, Lecture, Seminar
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 1.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 2.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture
Credit Hours: 1.000 Schedule Types: Clinical, Practicum
Credit Hours: 1.000 Schedule Types: Clinical, Lab
Credit Hours: 2.000 Schedule Types: Clinical, Lab
Credit Hours: 3.000 Schedule Types: Clinical, Lab
Credit Hours: 3.000 Schedule Types: Clinical

Credit Hours: 3.000 Schedule Types: Clinical
Credit Hours: 2.000 Schedule Types: Reseach
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Studio
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 4.000 Schedule Types: Studio
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio

Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Lab
Credit Hours: 6.000 Schedule Types: Studio
Credit Hours: 6.000 Schedule Types: Studio
Credit Hours: 4.000 Schedule Types: Studio
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Lab
Credit Hours: 6.000 Schedule Types: Studio
Credit Hours: 3.000

Credit Hours: 3.000
Credit Hours: 3.000
Credit Hours: 3.000
Credit Hours: 3.000 Schedule Types: By Appointment, Online By Appointment, On-Line
Credit Hours: 1.500 Schedule Types: By Appointment, On-Line
Credit Hours: 1.500 Schedule Types: By Appointment, On-Line
Credit Hours: 1.500 Schedule Types: By Appointment, On-Line
Credit Hours: 1.500 Schedule Types: By Appointment, On-Line
Credit Hours: 3.000 Schedule Types: By Appointment, Online By Appointment, On-Line

Credit Hours: 1.500
Schedule Types: By
Appointment, On-Line

Credit Hours: 1.500
Schedule Types: By
Appointment, On-Line

Credit Hours: 1.500
Schedule Types: By
Appointment, On-Line

Credit Hours: 1.500
Schedule Types: By
Appointment, On-Line

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types: Lab

Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 3.000 Schedule Types: Lab
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 1.000 - 20.000 Schedule Types: Reseach
Credit Hours: 1.000 - 30.000 Schedule Types: Reseach
Credit Hours: 1.000 - 10.000 Schedule Types: Reseach



Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Lecture,
Seminar

Credit Hours: 3.000
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours:3.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lab,
Reseach

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: Lab,
Reseach

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

3.000 Credit hours
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Seminar

Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 - 20.000 Schedule Types: Reseach
Credit Hours: 1.000 - 30.000 Schedule Types: Reseach

Credit Hours: 1.000 - 20.000
Schedule Types: Reseach

Credit Hours: 1.000 - 10.000
Schedule Types: Reseach

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/Studio
Combination, Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 5.000
Schedule Types: Lecture,
Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Internship

Credit Hours: 3.000
Schedule Types:
Independent Study

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 5.000
Schedule Types: Lecture

Credit Hours: 1.500
Schedule Types: Lecture,
Online By Appointment 8
Week, On-Line

<p>Credit Hours: 1.500 Schedule Types: Lecture, Online By Appointment 8 Week, On-Line</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture, On-Line</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture, On-Line</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture, On-Line</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture, On-Line</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture, On-Line</p>
<p>Credit Hours: 3.000 Schedule Types: By Appointment - 1 student, By Appointment, Lecture, On-Line</p>

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment, Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment - 1 student,
Lecture, Lecture/On-
Line, On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Schedule Types: By Appointment - 1 student, By Appointment - 2 students, By Appointment, Lecture

Credit Hours:3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By Appointment, Lecture, On-Line

Credit Hours: 1.500
Schedule Types: Lecture, Online By Appointment 8 Week, On-Line

Credit Hours: 1.500
Schedule Types: Lecture, Online By Appointment 8 Week, On-Line

Credit Hours: 3.000
Schedule Types: Lecture, On-Line

Credit Hours: 3.000
Schedule Types: Lecture, On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: By
Appointment - 1 student,
By Appointment,
Lecture, On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment, Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment - 1 student,
Lecture, Lecture/On-
Line, On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment - 1 student,
By Appointment - 2
students, By
Appointment, Lecture

Credit Hours:3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment, Lecture,
On-Line

Credit Hours: 3.000

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 6.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lecture,
Studio

Credit Hours: 3.000
Schedule Types: Lecture,
Studio

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment - 1 student,
Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment, Lecture,
Lecture/Studio
Combination, Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Credit hours
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment,
Independent Study

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 1.000
Schedule Types: Studio

Credit Hours: 6.000
Schedule Types: Studio

Credit Hours: 4.000
Schedule Types: Studio

Credit Hours: 4.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, On-Line

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, On-Line

Credit Hours: 3.000
Schedule Types: Lab,
Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/Studio
Combination, Studio

Credit Hours: 3.000
Schedule Types: Lecture,
Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000

Credit Hours: 4.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/Studio
Combination, Studio

Credit Hours: 4.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: By
Appointment, Lecture,
Lecture/Lab

Credit Hours: 3.000
Schedule Types:
Independent Study

Credit Hours: 4.000
Schedule Types: Studio

Credit Hours: 4.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Studio

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture,
On-Line

Credit Hours: 6.000
Schedule Types: Clinical

Credit Hours: 6.000
Schedule Types: Clinical

Credit Hours: 8.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Clinical,
Exam, Lecture, Seminar

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.500
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Clinical,
Exam, Lecture, Seminar

Credit Hours: 3.000
Schedule Types: Clinical,
Exam, Lecture, Seminar

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.00-4.000
Schedule Types: Lecture

Credit Hours: 2.000 -
4.000
Schedule Types: Clinical,
Practicum, Seminar

Credit Hours: 1.000 -
6.000
Schedule Types:
Independent Study, Lab

<p>Credit Hours: 1.000 - 6.000 Schedule Types: Independent Study, Lab</p>
<p>Credit Hours: 1.000 Schedule Types: Reseach</p>
<p>Credit Hours: 2.000 Schedule Types: Reseach</p>
<p>Credit Hours: 2.000 Schedule Types: Lecture, Lecture/On-Line</p>
<p>Credit Hours: 1.000 Schedule Types: Clinical, Reseach</p>
<p>Credit Hours: 1.000 Schedule Types: Clinical, Reseach</p>
<p>Credit Hours: 3.000 Schedule Types: Clinical, Practicum</p>
<p>Credit Hours: 3.000 Schedule Types: Clinical, Practicum</p>
<p>Credit Hours: 3.000 Schedule Types: Clinical, Practicum</p>
<p>Credit Hours: 3.000 Schedule Types: Clinical, Practicum</p>
<p>Credit Hours: 1.000 Schedule Types: Exam, Lecture, On-Line</p>

Credit Hours: 3.000 Schedule Types: On-Line
Credit Hours: 3.000 Schedule Types: On-Line
Credit Hours: 3.000 Schedule Types: On-Line
Credit Hours: 3.000 Schedule Types: On-Line
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
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Schedule Types: Lecture

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Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 1.000 TO
3.000
Schedule Types: Reseach

Credit Hours: 3.500
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.500
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.500
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000 Schedule Types: Lab, Lecture, Lecture/Lab
Credit Hours: 3.000 Schedule Types: Lab, Lecture, Lecture/Lab
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture/Lab
Credit Hours: 3.000 Schedule Types: Clinical, Lecture, Practicum, Reseach
Credit Hours: 0.000 Schedule Types: Clinical, Exam, On-Line
Credit Hours: 0.000 OR 3.000 Schedule Types: Lab, Lecture
Credit Hours: 0.000 OR 3.000 Schedule Types: Lab, Lecture, Lecture/Lab

Credit Hours: 0.000 OR 3.000 Schedule Types: Lab, Lecture
Credit Hours:
Credit Hours: 0.000 TO3.000 Schedule Types: Lab, Lecture, On-Line
Credit Hours: 0.000 OR 3.000 Schedule Types: Lab, Lecture
Credit Hours: 3.000 Schedule Types: Lab, Lecture, Lecture/Lab
Credit Hours: 3.000 Schedule Types: Lab, Lecture
Credit Hours: 1.000 Schedule Types: Lab
Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 3.000 Schedule Types: Lab, Lecture, Lecture/Lab
Credit Hours: 3.000 Schedule Types: Clinical, Lecture, Practicum
Credit Hours: 3.000 Schedule Types: Clinical, Lecture, Practicum
Credit Hours: 3.000 Schedule Types: Clinical
Credit Hours: 3.000 Schedule Types: Clinical

Credit Hours: 0.000
Schedule Types: Clinical,
Exam, On-Line



Credit Hours: 10.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Lecture/Lab
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 3.000
Credit Hours: 3.000 Schedule Types: Lecture/Lab, Seminar
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 1.000 Schedule Types: Lecture/Lab
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000 to
3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types: Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

2.000 Credit hours Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 1.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 Schedule Types: Lecture
Credit Hours: 1.000 Schedule Types: Reseach, Seminar
Credit Hours: 1.000 Schedule Types: Reseach, Seminar
Credit Hours: 1.000 to 6.000 Schedule Types: Clinical, Independent Study
Credit Hours: 1.000 to 6.000 Schedule Types: Reseach

Credit Hours: 1.000 to
6.000
Schedule Types: Reseach

Credit Hours: 1.000 to
6.000
Schedule Types: Reseach

Credit Hours: 1.000 to
6.000
Schedule Types: Reseach

Credit Hours: 1.000 to
6.000
Schedule Types: Reseach

Credit Hours: 1.000 to 20.000 Schedule Types: Reseach
Credit Hours: 1.000 to 30.000 Schedule Types: Reseach
Credit Hours: 1.000 to 10.000 Schedule Types: Reseach
Credit Hours: 4.000 Schedule Types: On-Line
Credit Hours: 4.000 Schedule Types: On-Line
Credit Hours: 2.500 Schedule Types: On-Line
Credit Hours: 1.000 Schedule Types: On-Line
Credit Hours: 4.000 Schedule Types: On-Line
Credit Hours: 2.000 Schedule Types: Rotation

Credit Hours: 3.000
Schedule Types: Lecture,
Rotation

Credit Hours: 3.000
Schedule Types: Lecture,
Rotation

Credit Hours: 4.000
Schedule Types: Rotation

Credit Hours: 5.000
Schedule Types: By
Appointment, Rotation

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 1.000
Schedule Types: Lab

Credit Hours: 1.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 2.500
Schedule Types: On-Line

Credit Hours: 1.000
Schedule Types: Lab,
Online Lab

Credit hours
Schedule Types: By
Appointment, Lab

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 1.500
Schedule Types: On-Line

Credit Hours: 4.000
Schedule Types: On-Line

Credit Hours: 1.500
Schedule Types:
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit hours
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 1.500
Schedule Types: On-Line

Credit Hours: 1.500
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 2.000
Schedule Types: On-Line

Credit Hours: 1.000
Schedule Types: On-Line

Credit Hours: 1.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 1.500
Schedule Types: On-Line

Credit Hours: 1.500
Schedule Types: On-Line

Credit Hours: 1.500
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 2.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit hours: 2.000
Schedule Types: On-Line

Credit Hours: 1.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 1.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 1.000
Schedule Types: On-Line



Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 3.000



Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 3.000 Schedule Types: Lecture/On-Line
Credit Hours:3.000 Schedule Types: Lecture/On-Line
Credit Hours:3.000 Schedule Types: Lecture/On-Line
Credit Hours: 2 000 Schedule Types: Practicum
Credit Hours: 2.000 Schedule Types: Practicum
Credit Hours: 2.000 Schedule Types: Practicum
Credit Hours: 3.000 to 6.000 Schedule Types: Clinical
Credit Hours: 3.500 Schedule Types: Clinical
Credit Hours: 6.000 Schedule Types: Clinical
Credit Hours: 0.000 to 6.000 Schedule Types: Clinical, Lab, Lecture
Credit Hours: 3.000 TO 6.000 Schedule Types: Clinical
Credit Hours: 3.000 Schedule Types: On-Line

Credit Hours: 3.000 Schedule Types: Clinical
Credit Hours: 4.000 Schedule Types: Lecture/Lab
Credit Hours: 1.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Reseach
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 3.000 Schedule Types: Reseach
Credit Hours: 2.000 Schedule Types: Lecture/Lab
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 3.000 Schedule Types: Reseach

Credit Hours: 1.000
Credit hours
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture

Credit hours: 1.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: Clinical

Credit Hours: 1.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Clinical

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000 Schedule Types: Lecture, Seminar
Credit Hours: 1.000 to 20.000 Schedule Types: Reseach
Credit Hours: 1.000 to 30.000 Schedule Types: Reseach
Credit Hours: 1.000 to 10.000 Schedule Types: Reseach
Credit Hours: 3.000 Schedule Types: Lecture, On-Line
Credit Hours: 3.000 Schedule Types: Lecture, On-Line
Credit Hours: 3.000 Schedule Types: Clinical, Didactic, On-Line
Credit Hours:3.000 Schedule Types: Clinical, Didactic, On-Line
Credit Hours: 3.000 Schedule Types: Clinical
Credit Hours: 3.000 Schedule Types: Lecture, On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: On-
Line, Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types:
Seminar, On-Line

Credit Hours: 3.000
Schedule Types:
Seminar, On-Line

Credit Hours: 3.000
Schedule Types: Clinical,
Didactic, Lecture,
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Clinical,
Didactic, Lecture,
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Clinical,
Didactic, Lecture,
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types:
Didactic, Lecture

Credit Hours: 3.000
Schedule Types: Clinical,
Lecture

Credit Hours: 3.000
Schedule Types:
Didactic, Lecture, On-
Line

Credit Hours: 3.000
Schedule Types: Clinical,
Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Clinical,
Didactic, Lecture

Credit Hours: 3.000
Schedule Types: Clinical,
Lecture

Credit Hours: 4.000

Credit Hours: 4.000

Credit Hours: 4.000

Credit Hours: 3.000
Schedule Types: Clinical,
Didactic, Lecture,
Lecture/Lab

<p>Credit Hours: 3.000 Schedule Types: Didactic, Lecture/Lab</p>
<p>Credit Hours: 3.000 Schedule Types: Didactic, Lecture/Lab</p>
<p>Credit Hours: 3.000 Schedule Types: Clinical, Lecture/Lab</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture/Lab</p>
<p>Credit Hours: 3.000 Schedule Types: Clinical, On-Line</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture, On-Line</p>



Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Clinical,
Didactic, Lecture

Credit Hours: 3.000
Schedule Types: Clinical,
Didactic, Lecture,
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Clinical,
Lecture/Lab

Credit Hours: 3.000
Schedule Types: On-
Line, Reseach

Credit Hours: 3.000

Credit Hours: 3.000
Schedule Types:
Didactic, Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Lecture/Lab, On-Line

Credit Hours: 3.000
Schedule Types: On-
Line, Seminar

Credit Hours: 3.000
Schedule Types: Clinical,
Lecture, On-Line

Credit Hours: 3.000
Schedule Types:
Didactic, Lecture,
Lecture/Lab, Practicum,
Seminar

Credit Hours: 3.000
Schedule Types:
Lecture/Lab, Lecture/On-
Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Clinical,
On-Line, Seminar

Credit Hours: 3.000
Schedule Types: Clinical,
On-Line

Credit Hours: 2.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
Seminar

Credit Hours: 0.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Clinical,
Lecture

Credit Hours: 3.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Clinical,
Seminar

Credit Hours: 3.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Hybrid

Credit Hours: 3.000
Schedule Types: Hybrid

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Lecture,
Online

Credit Hours: 3.000
Schedule Types:
Seminar, Hybrid



Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 1.000

Credit Hours: 0.500

Credit Hours: 1.000

Credit Hours: 1.000

Credit Hours: 3.000

Credit Hours: 1.000

Credit Hours: 3.000

Credit Hours: 0.500

Credit Hours: 3.000

Credit Hours: 1.000

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Credit Hours: 1.500

Credit Hours: 1.000

Credit Hours: 0.500

Credit Hours: 1.000

Credit Hours: 3.000

Credit Hours: 3.000
Credit Hours: 1.500
Credit Hours: 1.000 Schedule Type: Hybrid
Credit Hours: 3.000 Schedule Types: Hybrid; Lecture, small group
Credit Hours: 4.000 Schedule Type: Hybrid, Lecture/Lab
Credit Hours: 2.000 Schedule Type: Hybrid; Lecture/Lab, small group
Credit Hours: 3.000 Schedule Type: Lecture, small group
Credit Hours: 4.000 Schedule Type: Hybrid, Lecture/Lab

Credit Hours: 1.000
Schedule Type: Hybrid;
Lecture/Lab

Credit Hours: 3.000
Schedule Type: Hybrid;
Lecture, small group

Credit Hours: 1.000
Schedule Type: Hybrid;
Lecture/Lab, small group

Credit Hours: 1.000
Schedule Type: Hybrid;
Lecture/Lab

Credit Hours: 1.000
Schedule Type: Hybrid;
Lecture/Lab

Credit Hours: 1.000
Schedule Type: Clinical

Credit Hours: 3.000
Schedule Type: Hybrid;
Lecture/Lab, small
groups

Credit Hours: 1.000
Schedule Type: Clinical

Credit Hours: 4.000
Schedule Type: Hybrid;
Lecture/Lab, small
groups

Credit Hours: 5.000
Schedule Type: Hybrid;
Lecture/Lab, small
groups

Credit Hours: 3.000
Schedule Type: Hybrid;
Lecture/Lab

Credit Hours: 3.000
Schedule Type: Hybrid;
Lecture

Credit Hours: 3.000
Schedule Type: Hybrid;
Lecture/Lab, small
groups

Credit Hours: 1.000
Schedule Type: Hybrid;
Clinical

Credit Hours: 3.000
Schedule Type: Hybrid;
Lecture, small group

Credit Hours: 3.000
Schedule Type: Hybrid;
Lecture/Lab

Credit Hours: 2.000
Schedule Type: Hybrid;
Lecture/Lab

Credit Hours: 2.000
Schedule Type: Hybrid;
Lecture/Lab, small group

Credit Hours: 2.000
Schedule Type: Hybrid;
Lecture, small groups

Credit Hours: 1.000
Schedule Type: Hybrid;
Lecture, small groups

Credit Hours: 5.000
Schedule Type: Clinical

Credit Hours: 5.000
Schedule Type: Clinical

Credit Hours: 1.000
Schedule Type: Hybrid;
Lecture, small groups

Credit Hours: 5.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000
Schedule Types:
Lecture/lab, small groups

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lab

Credit Hours: 1.000
Schedule Types: Clinical,
Small Group

Credit Hours: 3.000
Schedule Types: Lecture,
Small Group

Credit hours: 1.000
Schedule Types: Lecture,
On-Line

Credit Hours: 1.000
Schedule Types: Lecture,
On-Line

Credit Hours: 1.000
Schedule Types:
Seminar, Small Group

Credit Hours: 4.00
Schedule Types: Lecture,
small groups

Credit Hours: 3.000
Schedule Types:
Lecture,small groups

Credit Hours: 3.000
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
small groups

Credit Hours: 3.000
Schedule Type: On-line

Credit Hours: 6.000

Credit Hours: 3.000
Schedule Types: Lecture,
small groups

Credit Hours: 1.000
Schedule Types:
Seminar

Credit Hours: 1.000
Schedule Types: Seminar

Credit Hours: 1.000
Schedule Types:
Seminar

Credit Hours: 6.000
Schedule Types: Seminar

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 4.000
Schedule Types: On-Line, Seminar

Credit Hours: 3.000
Schedule Types: On-
Line, Seminar

Credit Hours: 2.000
Schedule Types: On-line,
Seminar

Credit Hours: 12.000
Schedule Types:
Lecture/On-Line

Credit Hours: 12.000
Schedule Types:
Lecture/On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: On-Line

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Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 1.000
Schedule Types: On-Line

Credit Hours: 1.000 to
4.000
Schedule Types: On-Line

Credit Hours: 3.000 to
6.000
Schedule Types:
Independent Study, On-
Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line, Seminar

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line, Reseach, Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line, Reseach, Seminar

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

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Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 5.000

Credit Hours: 2.000

Credit Hours: 0.500

Credit Hours: 1.000

Credit Hours: 8.000

Credit Hours: 4.000

Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 2.500

Credit Hours: 6.000

Credit Hours: 1.000

Credit Hours: 1.000

Credit Hours: 6.000
Credit Hours: 6.000
Credit Hours: 2.000
Credit Hours: 2.000 Schedule Types: Lecture, Lecture/Phys Asst Group Mtg, Physician Asst Group Meeting
Credit Hours: 2.000 Schedule Types: Lab, Lecture
Credit Hours: 2.000 Schedule Types: Lab, Lecture, Lecture/Lab
Credit Hours: 3.000 Schedule Types: Lab, Lecture, Lecture/Lab
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture

Credit Hours: 5.000
Schedule Types: Lab,
Lecture, Lecture/Lab,
Lecture/Phys Asst Group
Mtg

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 9.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Seminar

1.000 TO 20.000
Schedule Types: Reseach

Credit Hours: 1.000 to
30.000
Schedule Types: Reseach

Credit Hours: 1.000 to
10.000
Schedule Types: Reseach

Credit Hours: 3.000
Schedule Types: Seminar

Credit Hours: 1.000
Schedule Types:
Didactic, Lecture

Credit Hours: 1.000
Schedule Types: Researc

Credit Hours: 3.000
Schedule Types:
Didactic, Lecture

Credit Hours: 3.000
Schedule Types: Didactic

Credit Hours 2.000
Schedule Types: Didactic

Credit Hours: 6.000
Schedule Types: Didactic

Credit Hours: 6.000
Schedule Types:
Research



Credit Hours: 10.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000 to
3.000
Schedule Types: Lecture

Credit Hours: 2.000 to
3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000 s
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Reseach

Credit Hours: 3.000
Schedule Types: Reseach

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Schedule Types: Reseach

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 1.000 TO 4.000 Schedule Types: Reseach
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 2.000 Schedule Types: Lecture
Credit Hours: 1.000 to 6.000 Schedule Types: Clinical, Independent Study
Credit Hours: 1.000 to 6.000 Schedule Types: Reseach
Credit Hours: 1.000 to 6.000 Schedule Types: Clinical, Independent Study, Reseach
Credit Hours: 1.000 to 6.000 Schedule Types: Reseach
Credit Hours: 1.000 to 6.000 Schedule Types: Reseach

Credit Hours: 1.000 to 6.000
Schedule Types: Reseach

Credit Hours: 1.000 to 20.000
Schedule Types: Reseach

Credit Hours: 1.000 to 30.000
Schedule Types: Reseach

Credit Hours: 1.000 to 10.000
Schedule Types: Reseach

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture

Credit Hours: 2.000
Schedule Types: Didactic,
Exam, Lecture

Credit Hours: 2.000
Schedule Types: Didactic,
Exam, Lecture,

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, TBL, Quiz

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, TBL, Quiz

Credit Hours: 1.000
Schedule Types: Didactic

Credit Hours: 1.000
Schedule Types: Didactic

Credit Hours: 2.000
Schedule Types: Didactic,
Exam, Lecture, Final
Project

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, Seminar

Credit Hours: 2.000
Schedule Types: Didactic
,Exam, Lecture

Credit Hours: 1.000
Schedule Types: Clinical

Credit Hours: 1.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: -Didactic,
Exam, Lecture/Lab

Credit Hours: 1.000
Schedule Types: Didactic,
Exam, Lecture

Credit Hours: 3.000
Schedule Types: Didactic,
Lecture, Seminar

Credit Hours: 1.000
Schedule Types: Clinical

Credit Hours: 2.000
Schedule Types: -Didactic,
Exam, Lecture

Credit Hours: 3.000
Schedule Types:-Didactic,
Exam, Lecture

Credit Hours: 1.000
Schedule Types: Lab,
Exam

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture

Credit Hours: 1.000
Schedule Types: Didactic,
Lecture

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, Seminar

Credit Hours: 1.000
Schedule Types: Clinical,
~~Lecture~~ Lab

Credit Hours: 1.000
Schedule Types: Lecture,
Seminar

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture

Credit Hours: 1.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture

Credit Hours: 1.000
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, Seminar

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, TBL

Credit Hours: 1.000
Schedule Types: Lab,
Lecture

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, TBL, Quiz

Credit Hours: 2.000
Schedule Types:
Lecture/On-Line, Small
group work in person and
online

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, Seminar

Credit Hours: 1.000
Schedule Types:
Practicum, Seminar

Credit Hours: 2.000
Schedule Types: On-Line,
Seminar

Credit Hours: 2.000
Schedule Types: Didactic,
Exam, Lecture,-TBL

Credit Hours: 2.000
Schedule Types: -Didactic,
Exam, Lecture, Small
Group, TBL

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, TBL, Quiz

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, TBL

Credit Hours: 2.000
Schedule Types: Clinical

Credit Hours: 1.000
Schedule Type: Lab

Credit Hours: 2.000
Schedule Types: Didactic,
Lecture, Seminar

Credit Hours: 2.000
Schedule Types:- Didactic,
Exam, Lecture, Small
Group

Credit Hours: 2.000
Schedule Types: Clinical

Credit Hours: 2.000
Schedule Types: Didactic,
Lecture

Credit Hours: 2.000
Schedule Types: Didactic,
Lecture, Seminar

Credit Hours: 2.000
Schedule Types: Didactic,
Lecture, Seminar

Credit Hours: 2.000
Schedule Types: Didactic,
Lecture, Seminar

Credit Hours: 2.000
Schedule Types: Didactic,
Lecture, Seminar

Credit Hours: 2.000
Schedule Types: Didactic,
Exam, Lecture, Small
Group

Credit Hours: 2.000 Schedule Types:-Didactic, Exam, Lecture, Small Group	
Credit Hours: 2.000 Schedule Types: Didactic, Lecture, Seminar	
Credit Hours: 2.000 Schedule Types: Didactic, Lecture, Seminar	
Credit Hours: 0.250 Schedule Types: Independent Study	
Credit Hours: 0.250 Schedule Types: Independent Study	
Credit Hours: 0.250 Schedule Types: Independent Study	
Credit Hours: 0.250 Schedule Types: Independent Study	
Credit Hours: 1.000 Schedule Types: Lecture, Independent Study	

Credit Hours: 1.000
Schedule Types: Didactic,
Lecture, Exam

Credit Hours: 3.000
Schedule Types: Didactic,
Exam, Lecture, Small
Group

Credit Hours: 1 .000 TO
3.000
Schedule Types:
Independent Study,
Clinical

Credit Hours: 1.000
Schedule Types: Didactic,
Exam, Lecture/On-line.

Credit Hours: 6.000
Schedule Types: Clinical

Credit Hours: 6.000
Schedule Types: Clinical

Credit Hours: 6.000
Schedule Types: Clinical

Credit Hours: 6.000
Schedule Types: Clinical

Credit Hours: 6.000
Schedule Types: Clinical



Credit Hours: 4.000
Schedule Types:
Lecture/Lab

Credit Hours: 6.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 5.000
Schedule Types:
Lecture/Lab

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Online

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 1.000
Schedule: Clinical,
Seminar

Credit Hours: 1.000
Schedule: Clinical,
Seminar

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 4.000
Schedule Types:
Lecture/Lab

Credit Hours: 4.000
Schedule Types:
Lecture/Lab

Credit Hours: 4.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 5.000
Schedule Types:
Lecture/Lab

Credit Hours: 4.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours:1.000
Schedule Types:
Research, Seminar, Small
Group

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Clinical,
Seminar

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/Lab

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Clinical

Credit Hours: 2.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: On-Line

Credit Hours: 1.000
Schedule Types:
Research, Seminar, Small
Group

Credit Hours: 1.000
Schedule Types:
Research, Seminar, Small
Group

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Lecture/Lab

Credit Hours: 6.000
Schedule Types: Clinical

Credit Hours: 8.000
Schedule Types: Clinical

Credit Hours: 5.000
Schedule Types: Lab,
Lecture, Lecture/Lab,
On-Line

Credit Hours: 1.500
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 1.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 1.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 1.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 5.000
Schedule Types: Lab,
Lecture, Lecture/Lab,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 4.000
Schedule Types: Lecture,
Seminar

Credit Hours: 4.000
Schedule Types: Lecture,
Seminar

Credit Hours: 1.500
Schedule Types: Clinical,
Lecture, Lecture/Lab,
On-Line

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 1.000
Schedule Types: Clinical,
Lab, Lecture,
Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/Lab, On-Line

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.500
Schedule Types: Clinical,
Lecture

Credit Hours: 2.500
Schedule Types: Lecture,
Lecture/Lab, On-Line

Credit Hours: 2.500
Schedule Types: Lecture

Credit Hours: 1.500
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 6.000
Schedule Types: Lecture

Credit Hours: 5.000
Schedule Types: Clinical,
Lecture, On-Line

Credit Hours: 5.000
Schedule Types: Clinical,
Lecture, On-Line

Credit Hours: 5.000
Schedule Types: Clinical,
Lecture, On-Line

Credit Hours: 5.000
Schedule Types: Clinical,
Lecture, On-Line

Credit Hours: 5.000
Schedule Types: Clinical,
Lecture, On-Line

Credit Hours: 5.000
Schedule Types: Clinical,
Lecture, On-Line

Credit Hours: 5.000
Schedule Types: Clinical,
Lecture, On-Line

5.000 Credit hours
Schedule Types: Clinical,
Lecture, On-Line

Credit Hours: 1.000
Schedule Types: Lecture,
On-Line

Credit Hours: 1.000
Schedule Types: Lecture,
On-Line

Credit Hours: 0.500
Schedule Types: Clinical,
Lab, Lecture, On-Line,
Reseach

Credit Hours: 0.500
Schedule Types: Clinical,
Lab, Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 0.000



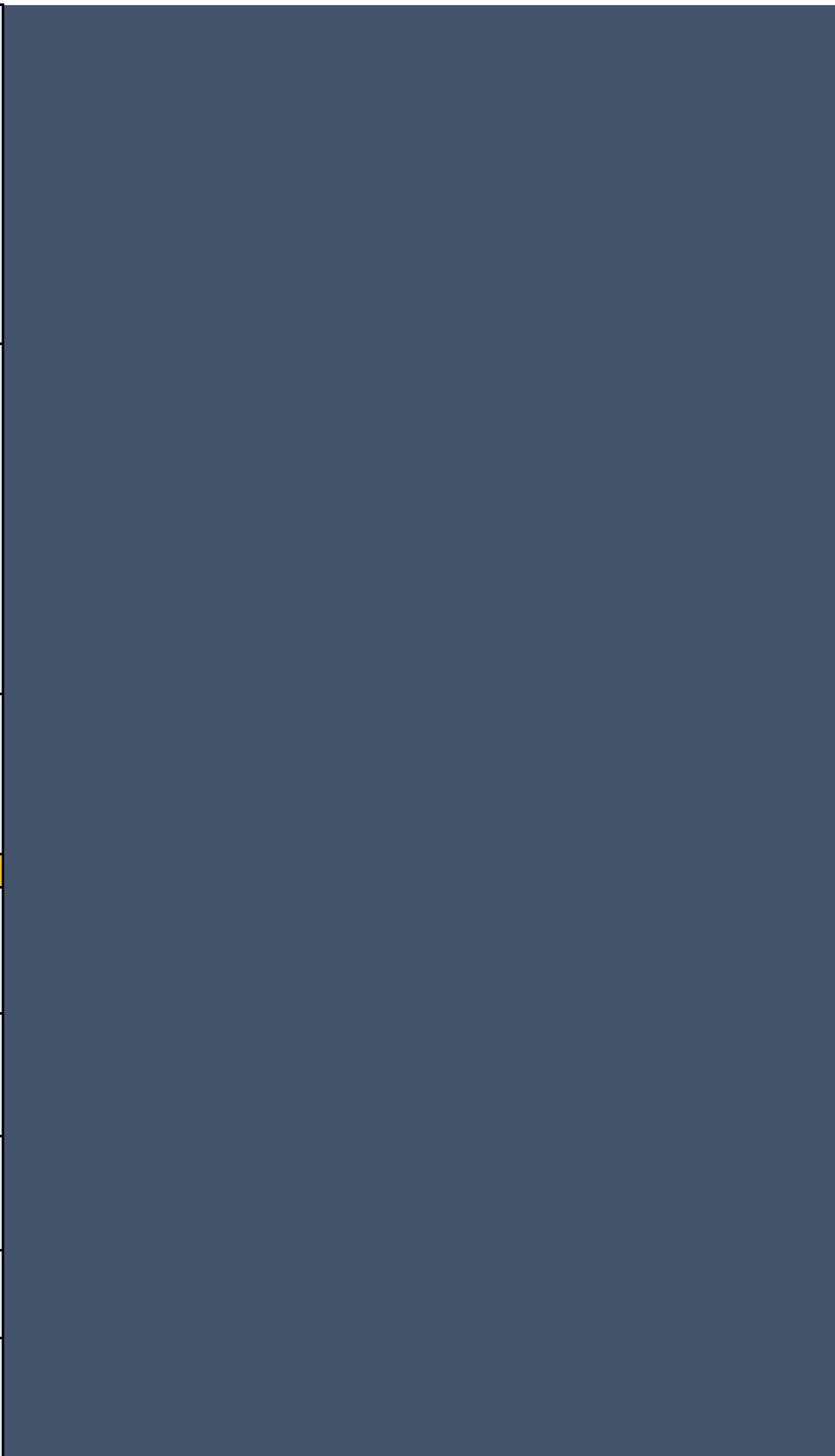
Credit Hours: 10.000
Schedule Types:
Lecture/Lab

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture



Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture,
Tutorial

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture,
Seminar

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture,
Tutorial

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 2.000 Schedule Types: Seminar
Credit Hours: 3.000 Schedule Types: Exam, Lecture
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 1.000 Schedule Types: Seminar
Credit hours Schedule Types: Seminar
Credit Hours: 1.000 Schedule Types: Seminar
Credit Hours: 1.000 Schedule Types: Lecture

Credit Hours: 1.000 to
20.000
Schedule Types: Reseach

Credit Hours: 1.000 to
30.000
Schedule Types: Reseach

Credit Hours: 1.000 TO
10.000
Schedule Types: Reseach

Credit Hours: 3.000
Schedule Types: On-line

Credit Hours: 3.000
Schedule Types: On-line

Credit Hours: 3.000
Schedule Types: On-line

Credit Hours: 3.000
Schedule Types: On-line

Credit Hours: 3.000
Schedule Types: On-line

Credit Hours: 3.000 Schedule Types: On-line
Credit Hours: 3.000 Schedule Types: On-line; Writing Intensive
Credit Hours: 1.000 Schedule Types: in- person
Credit Hours: 1.000 Schedule Types: in- person
Credit Hours: 1.000 Schedule Types: in- person
Credit Hours: 1.000 Schedule Types: in- person
Credit Hours: 1.000 Schedule Types: in- person
Credit Hours: 1.000 Schedule Types: in- person
Credit Hours: 3.000 Schedule Types: By Arrangement
Credit Hours: 3.000 Schedule Types: By Arrangement
Credit Hours: 3.000 Schedule Types: By Arrangement
Credit Hours: 3.000 Schedule Types: Didactic, Lecture, On- Line, Practicum, Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line, Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line, Seminar

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line, Seminar

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours:
Schedule Types: On-
Line, Reseach

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 3.000
Schedule Types: Online

Credit Hours: 1.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line, Seminar

Credit Hours: 1.000 to
3.000
SchD1732:D1746edule
Types: Reseach

Credit Hours: 3.000
Schedule Types: Lecture

<p>1.000 TO 4.000 Credit hours Schedule Types: Seminar</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture</p>
<p>Credit Hours: 1.000 Schedule Types: Didactic, Seminar</p>
<p>Credit Hours: 1.000 Schedule Types: Didactic, Seminar</p>
<p>Credit Hours: 3.000 Schedule Types: Seminar</p>
<p>Credit Hours: 1.000 Schedule Types: Didactic, Lecture, Research, Seminar</p>
<p>Schedule Types: Independent Study, Lecture, On-Line, Research</p>
<p>Credit Hours: 3.000 Schedule Types: Lecture, Research, Seminar</p>
<p>Credit Hours: 2.000 Schedule Types: Lecture</p>

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 2.000 Schedule Types: Lecture/Lab	
Credit Hours: 1.000 Schedule Types: Lecture	
3.000 Credit hours Schedule Types: Seminar	
Credit Hours: 3.000 Schedule Types: Lecture	
Credit Hours: 1.000 to 3.000 Schedule Types: Independent Study	
Credit Hours: 3.000 Schedule Types: Reseach	
Credit Hours: 3.000 to 6.000 Schedule Types: Clinical	
Credit Hours: 1.000 to 6.000 Schedule Types: Reseach	

3.000 TO 6.000
Schedule Types: Clinical,
Independent Study

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line,
Reseach

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line,
Reseach

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line,
Reseach

Credit Hours: 3.000
Credit hours
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line,
Reseach

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line,
Reseach

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line,
Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line,
Seminar

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line

Credit Hours: 2.000
Schedule Types: Seminar

Credit Hours: 1.000
Schedule Types:
Lecture/On-Line,
Seminar

Credit Hours: 3.000
Schedule Types: Lecture,
Seminar

Credit Hours: 0.000
Schedule Types: Lecture,
On-Line, Seminar

Credit Hours: 0.000

Credit Hours: 0.000
Schedule Types: Reseach

Credit Hours: 0.000
Schedule Types: Seminar

Credit Hours: 6.000
Schedule Types: Clinical,
Lab, Lecture

Credit Hours: 3.000 to
6.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Clinical

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types:
Independent Study

Credit Hours: 4.000
Schedule Types: Lecture



Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types: On-Line

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 3.000 Schedule Types: Lecture/On-Line
Credit Hours: 3.000 Schedule Types: On-Line
Credit Hours: 3.000
Credit Hours: 3.000
Credit Hours: 3.000
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: By Appointment, Lecture
Credit Hours: 0.500 Schedule Types: By Appointment - 1 student, Lecture
Credit Hours: 0.500 Schedule Types: Independent Study

Credit Hours: 2.000	
Credit Hours: 2.000	
Credit Hours: 2.000	
Credit Hours: 5.000	
Credit Hours: 1.000	
Credit Hours: 1.000	
Credit Hours: 1.000	
Credit Hours: 1.000	
Credit Hours: 1.000	
Credit Hours: 3.000	
Credit Hours: 1.00	

Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 3.000

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Credit Hours: 3.000

Credit Hours: 3.000

Credit Hours: 2.000
Credit Hours: 3.000
Credit Hours: 3.000
Credit Hours: 2.000
Credit Hours: 3.000
Credit Hours: 0.000
Credit Hours: 4.000 Schedule Types: Lecture, Studio
Credit Hours: 4.000 Schedule Types: Lecture, Studio

Credit Hours: 4.000
Schedule Types: Lecture,
Studio

Credit Hours: 4.000
Schedule Types: Lecture,
Studio

Credit Hours: 4.000
Schedule Types: Lecture,
Studio

Credit Hours: 4.000
Schedule Types: Lecture,
Studio

Credit Hours: 4.000
Schedule Types: Lecture,
Studio

Credit Hours: 4.000
Schedule Types: Lecture,
Studio

Credit Hours: 4.000
Schedule Types: Lecture,
Studio

Credit Hours: 4.000
Schedule Types: Lecture,
Studio

Credit Hours: 1.500
Schedule Types: Lecture

Credit Hours: 1.500
Schedule Types: Lecture

Credit Hours: 1.500
Schedule Types: Lecture

Credit Hours: 1.500
Schedule Types: Lecture

Credit Hours: 1.500
Schedule Types: Lecture

Credit Hours: 1.500
Schedule Types: online

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/Studio
Combination, Studio

Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture, Studio
Credit Hours: 3.000 Schedule Types: Lecture, Studio
Credit Hours: 3.000 Schedule Types: Lecture, Studio
Credit Hours: 3.000 Credit hours Schedule Types: Internship
Credit Hours: 3.000 Credit hours Schedule Types: Independent Study
Credit Hours: 9.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Online
Studio, Studio

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/On-Line, On-
Line

Credit Hours: 3.000
Schedule Types:
Lecture/On-Line

Credit Hours: 1.500
Schedule Types: Lab

Credit Hours: 3.000
Schedule Types: Lecture,
Studio

Credit Hours: 4.000
Schedule Types: Online
Studio, Studio

Credit Hours: 4.000
Schedule Types: Online
Studio, Studio

Credit Hours: 2.000
Schedule Types: Lecture,
On-Line

Credit Hours: 2.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture;
On-Line

Credit Hours: 3.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lecture;
On-Line

Credit Hours: 6.000
Schedule Types: Lecture,
On-Line

Credit Hours: 3.000
Schedule Types: Lab,
Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Studio

Credit Hours: 3.000
Schedule Types: By
Appointment, Lecture

Credit Hours: 3.000
Schedule Types:
Independent Study

Credit Hours: 3.000
Schedule Types: By
Appointment - 1 student,
By Appointment,
Independent Study,
Lecture, Lecture/On-
Line, On-Line

Credit Hours: 6.000
Schedule Types: By Appointment - 1 student, By Appointment, Independent Study, Lecture, Lecture/On-Line, Online

Credit Hours: 3.000
Schedule Types: Hybrid, Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Hybrid, Lecture, Lecture/On-Line

Credit Hours: 3.000
Credit hours
Schedule Types: By Appointment, Hybrid, Lecture

Credit Hours: 3.000
Schedule Types: Hybrid, Lecture, Lecture/On-Line

Credit Hours: 3.000
Schedule Types: By Appointment, Hybrid, Lecture

Credit Hours: 3.000 Schedule Types: By Appointment, Hybrid, Lecture
Credit Hours: 3.000 Schedule Types: By Appointment, Hybrid
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Hybrid, Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 0.000 to 6.000 Schedule Types: Internship 3 Credits, Internship .5 Credits, Internship 6 Credits
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: By Appointment, Hybrid, Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Independent Study

Credit Hours: 3.000
Schedule Types: By Appointment - 1 student, Lecture

Credit Hours: 3.000
Schedule Type: Lecture, Lab

Credit Hours: 6.000
Schedule Type: Lecture, Lab

Credit Hours: 9.000
Schedule Type: Lecture, Lab

Credit Hours: 3.000
Schedule Type: Lecture, Lab

Credit Hours: 6.000
Schedule Type: Lecture, Lab

Credit Hours: 3.000
Schedule Types: Lab, Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lab, Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lab, Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lab, Lecture
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture, Lab
Credit Hours: 3.000 Schedule Types: Lecture, Lab
Credit Hours: 3.000 Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lab,
Lecture

Credit Hours: 3.000
Schedule Types: Lab,
Lecture

Credit Hours: 3.000
Schedule Types: Lecture

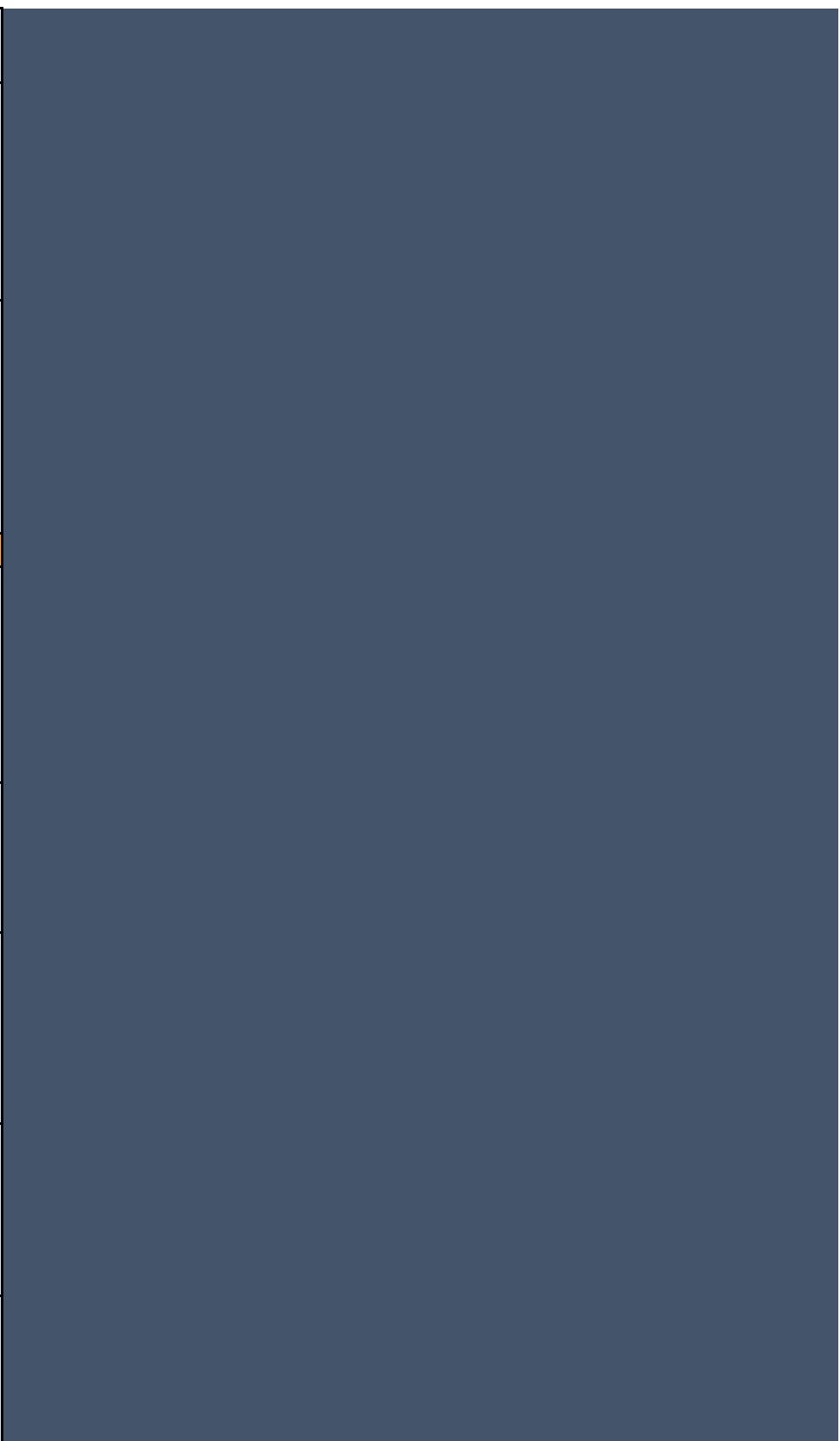
Credit Hours: 3.000
Credit hours
Schedule Types: Lab,
Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: By
Appointment. Lecture

Credit Hours: 3.000 Schedule Types: Independent Study
Credit Hours: 6.000 Schedule Types: By Appointment
Credit Hours: 9.000 Schedule Types: By Appointment - 2 students, Independent Study
Credit Hours: 3.000 Schedule Types: Lecture/Lab
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio
Credit Hours: 3.000 Schedule Types: Studio
Credit Hours: 3.000 Schedule Types: By Appointment - 1 student, Studio
Credit Hours: 0.000 Schedule Types: Lecture



Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: By
Appointment - 1 student,
Studio

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 2.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lab,
Lecture, Lecture/Lab

Credit Hours: 3.000
Schedule Types: Studio

Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio
Credit Hours: 3.000 Schedule Types: Internship
Credit Hours: 3.000 Schedule Types: Independent Study
Credit Hours: 1.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Study Abroad
Credit Hours: 3.000 Schedule Types: Lab, Lecture, Lecture/Lab
Credit Hours: 3.000 Schedule Types: Lecture
Credit Hours: 3.000 Schedule Types: Lecture, Studio

Credit Hours: 3.000 Schedule Types: Lecture, Studio	
Credit Hours: 3.000 Schedule Types: Lab, Lecture, Lecture/Lab	
Credit Hours: 4.000 Schedule Types: Lab, Lecture, Lecture/Lab	
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio	
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio	
Credit Hours: 3.000 Schedule Types: Lecture, Studio	
Credit Hours: 3.000 Schedule Types: Lecture, Lecture/Studio Combination, Studio	
Credit Hours: 4.000 Schedule Types: Lab, Lecture	

Credit Hours: 4.000
Schedule Types: Lab,
Lecture

Credit Hours: 3.000
Schedule Types: Lecture,
Lecture/Studio
Combination, Studio

Credit Hours: 3.000
Schedule Types: By
Appointment, Lecture,
Lecture/Studio
Combination, Studio

Credit Hours: 3.000
Schedule Types: Lecture

Credit Hours: 1.000
Schedule Types: Lab

Credit Hours: 6.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lab,
Lecture

Credit Hours: 3.000
Schedule Types: Lab,
Lecture

Credit Hours: 6.000
Schedule Types: Studio

Credit Hours: 3.000
Schedule Types: Lab,
Lecture

Credit Hours: 6.000
Schedule Types: Studio

Credit Hours: 3.000

