UPSTATE
MEDICAL UNIVERSITY

2024-2025

Academic Catalog

Upstate Medical University

The Academic Catalog accurately reflected curricular program requirements and course descriptions at the time of its publication. However, Upstate reserves the right to change the policies, including academic requirements, at any time.

Please see the following resources for additional information:

Academic Calendars:
http://www.upstate.edu/currentstudents/academic/records/calendars.php

Admission requirements, financial aid and tuition and fees:
http://www.upstate.edu/prospective/

The College of Graduate Studies:
http://www.upstate.edu/grad/

The College of Health Professions:
http://www.upstate.edu/chp/

The College of Medicine:
http://www.upstate.edu/com

The Central New York Master of Public Health:
http://upstate.edu/cnymph

The College of Nursing:
http://www.upstate.edu/con/

Student Life – Academic Resources – Support Services – Student Handbook:
https://www.upstate.edu/currentstudents/

SUNY Upstate Medical University

The State University of New York (SUNY) Upstate Medical University encompasses the College of Graduate Studies, College of Health Professions, College of Medicine, College of Nursing, and a clinical system comprising Upstate University Hospital with its downtown and community campuses, the region's only children's hospital, and an extensive network of specialty treatment services. Upstate educates physicians, research scientists, nurses, and public health and health care professionals. Upstate also provides graduate medical education, post-doctoral opportunities and a variety of continuing education for health professionals in the region.

Upstate Medical University traces its origins to 1834 when educators founded a medical school at Geneva College to train doctors for communities along the Erie Canal. In 1849, the school gained the distinction of awarding an MD degree to Elizabeth Blackwell, the first woman to graduate with an MD in this country.

In 1871, the medical school dean bought the college's medical library, anatomical museum, and other tangible assets. He and another Geneva faculty member approached Syracuse University and offered to donate these materials on condition that Syracuse University immediately establish and maintain a medical college consistent with American Medical Association standards. With support from the Onondaga County Medical Society, the Geneva medical faculty joined the Syracuse University College of Physicians and Surgeons, later known as the College of Medicine. In 1875, the new school was the third in the nation to adopt a three-year graded program, preceded only by Harvard Medical School and Chicago Medical College.

In 1936, President Franklin D. Roosevelt laid the cornerstone for a new teaching facility for medical education. This structure, later named Weiskotten Hall after the college's dean, Herman G. Weiskotten, remains the center of the basic science complex. It houses research laboratories, instructional rooms, the Health Sciences Library and faculty offices.

A program leading to the MS and PhD degrees in biochemistry was initiated in 1947 while the Medical College was still a part of Syracuse University. The program was then incorporated into the Graduate Program of the newly organized State University and expanded to include anatomy, microbiology, physiology and pharmacology, as well as medical technology. Today, the College of Graduate Studies currently offers MS and/or PhD degrees in six biomedical research disciplines.

In 1950, Upstate became part of the State University of New York, a public higher education system that currently includes 64 campuses.

The College of Health Professions was added in 1956 and offered a certificate in cytotechnology. The College was officially organized in 1971 to offer associates and bachelor's degrees in the allied health professions. The college currently offers upper-division and graduate degrees in eight health specialties.

In the late 1970s, the "Clinical Campus" at Binghamton was established. This site offers clinical education programs for third and fourth year medical students.

The College of Nursing was established in 1985 with a unique MS degree program for registered nurses and has expanded its offerings to meet the needs of registered nurses in the Central New York region. The College was fully accredited by the National League of Nursing in Fall 1991. It currently offers a BS completion program for RNs, masters programs to become a nurse practitioner, and a DNP program. The College is fully accredited by the Commission on Collegiate Nursing Education.

As the University developed its programs, it also saw great expansion of its physical plant. Growth in the1960s and 1970s included University Hospital, the Campus Activities Building, Clark Tower residence hall and Jacobsen Hall, which now houses administrative offices. A nine-story addition to Weiskotten Hall, a three-level parking garage, and the Campus West Building were all constructed with both public and private funding.

In 1983, the Regional Oncology Center was built and in 1985 a Pediatric Intensive Care Unit was added to the fourth floor of University Hospital. A day-care center was added in 1991 to meet the needs of Upstate's students, faculty and staff. The Health Sciences Library was completed in 1995 and the first major expansion of the University Hospital, a $52 million East Wing addition, was completed in 1996. In 2000, the Institute for Human Performance opened to house an array of biomedical scientists, rehabilitation specialists and educators working to reduce the impact of aging, illness and injury. The facility includes the largest block of research space on campus outside Weiskotten Hall, and a major expansion was completed in fall 2013. The Setnor Academic Building opened in the spring of 2007. Expansion of University Hospital to include the Upstate Golisano Children's Hospital, the only one in the region, was realized in 2009. A new Upstate Cancer Center, the region's only comprehensive outpatient resource for the treatment of cancer and blood disorders for adults and children, opened in 2014. The New Academic Building opened in 2015 and provides administrative and classroom space for the Colleges of Health Professions and Nursing. A new University Simulation Center opened in the fall of 2019, and Silverman Hall which houses many of the programs in the College of Health Professions was renovated in 2023.

By building upon its history and dedication to excellence, Upstate Medical University continues to expand services and to develop resources in virtually every field of medicine, making a major contribution to the quality of life in central New York and beyond.

The mission of SUNY Upstate Medical University is to improve the health of the communities we serve through education, biomedical research and health care.

The vision of Upstate Medical University is "United in expertise, compassion and hope to create a healthier world for all." The mission and visions are achieved through our shared values. We drive innovation and discovery by empowering our university to bring forth new ideas and to ensure quality; We respect people by treating all with grace and dignity; We serve our community by living our mission; We value integrity by being open and honest to build trust and teamwork and to embrace diversity and inclusion."

Accreditation

The SUNY Upstate Medical University is accredited by the Middle States Commission on Higher Education (MSCHE), 3624 Market Street, 2nd Floor West, Philadelphia, PA 19104, Phone: 267-284-5000. All educational programs are registered through the New York State Department of Education and are approved by the Veterans Administration for the training of veterans under Public Law 98-358. Program specific accreditation is provided by the following:

College of Health Professions:
Accreditation Review Commission on Education for the Physician Assistant, Inc. (ARC-PA)
12000 Findley Road, Suite 150
Johns Creek, GA 30097
Phone: 770-476-1224

Commission on Accreditation for Respiratory Care (CoARC)
1248 Harwood Road
Bedford, TX 76021-4244
Phone: 817-283-2835

Commission on Accreditation in Physical Therapy Education (CAPTE)
1111 North Fairfax Street
Alexandria, VA 22314
Phone: 703-706-3245

Commission on Accreditation of Allied Health Education Programs (CAAHEP)
1361 Park Street
Clearwater, FL 33756
Phone: 727-210-2350

Joint Review Committee on Education in Radiologic Technology (JRCERT)
20 North Wacker Drive, Suite 2850
Chicago, IL 60606-3182
Phone: 312-704-5300

National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)
5600 North River Road, Suite 720
Rosemont, IL 60018
Phone: 773-714-8880

College of Medicine:
Liaison Committee on Medical Education (LCME)
330 North Wabash Avenue, Suite 39300
Chicago, IL 60611-5885
Phone: 312-464-4933

Middle States Commission on Higher Education (MSCHE)
1007 North Orange Street
4th Floor, MB #166
Wilmington, DE 19801
Phone: 267-284-5011

Council on Education for Public Health (CEPH)
1010 Wayne Avenue, Suite 220
Silver Springs, MD 20910
Phone: 202-789-1050

College of Nursing:
Commission on Collegiate Nursing Education (CCNE)
One Dupont Circle NW, Suite 530
Washington, DC 20036-1120
Phone: 202-887-6791

Discrimination Policy and Title IX

Pursuant to University policy, the University is committed to fostering a diverse community of outstanding faculty, staff, and students, as well as ensuring equal educational opportunity, employment, and access to services, programs and activities, without regard to an individual's race, color, national origin, religion, creed, age, disability, sex, gender identity, sexual orientation, familial status, pregnancy, predisposing genetic characteristics, military status, domestic violence victim status, or criminal conviction. Employees, students, applicants or other members of the University community (including but not limited to vendors, visitors, and guest) may not be subject to harassment that is prohibited by law, or treated adversely or retaliated against based upon a protected characteristic.

The University's policy is in accordance with the federal and state laws and regulations prohibiting discrimination and harassment. These laws include the Americans with Disabilities Act (ADA), Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, Title VII of the Civil Rights Act of 1964 as Amended by Equal Employment Opportunity Act of 1972, and the New York State Human Rights Law. These laws prohibit discrimination and harassment, including sexual harassment and sexual violence.

Inquiries regarding the application of the Title IX and other laws, regulations and policies prohibiting discrimination may be directed to the Associate Vice President and Chief

Diversity Officer (Sipho Mbuqe), 1166 Weiskotten Hall, Upstate Medical University; Telephone: (315) 464-8668; Email: MbuqeS@upstate.edu.

Inquiries may also be directed to the United States Department of Education's Office for Civil Rights, 32 Old Slip 26th Floor, New York, NY 10005-2500; Tel. (646)-428-3800; Email: OCR.NewYork@ed.gov.

Assignment of Credit Hours

SUNY Upstate Medical University, as part of the State University of New York, has adopted the Carnegie Unit as a measure of academic credit. This is in compliance with the SUNY Policy on Credit/Contact Hour (Document Number 1305) and the United States Department of Education definition of a credit hour as "an amount of work represented in intended learning outcomes and verified by evidence of student achievement."
https://www.suny.edu/sunypp/documents.cfm?doc_id=168

Upstate Medical University offers a variety of instruction type of courses, including the standard lecture and laboratory courses. In addition, as an academic health science center, many of our courses are practicums. Each college reviews and approves their own curriculum. However, all follow the format of a standard credit hour awarded for fifteen 50-minute sessions of classroom instruction with a normal expectation of two hours of outside study for each class session. Therefore, a typical three credit hour course at Upstate Medical University meets for three 50-minute sessions per week for a fifteen-week semester, and thus totaling 45 sessions. Another format commonly used is the practicum course, such as our clinical courses. For these courses, credit is awarded as defined by the State University of New York (Document Number 1305) for full-time independent study.

Specifically, for clinical courses that meet full-time, one semester credit hour is awarded for each week of the course. For clinical courses that are not full-time, but rather interspersed with other coursework, one semester credit hour is awarded for every forty-five hours of involvement on the part of the student. As an example, a clinical course that meets for nine hours a week over the course of fifteen weeks would be assigned three semester credit hours.

New courses, revisions to current courses, and the programs of study are each approved through their respective college curriculum committee. It is the charge of each of these Committees to review and approve the curriculum in compliance with all federal, SUNY and national accreditation guidelines. In addition, many programs must be individually accredited by their respective professional organizations. Depending on the College, the approval for all curriculum may only rest with the Curriculum Committee or it may also require approval by the faculty organization of the College.

The ultimate authority for the curriculum of each college rests with the dean of the college who ultimately is responsible for ensuring that programs are reviewed periodically. Usually the review of programs and curriculum is an on-going process with reviews occurring annually based on student feedback, changes in the discipline, and updated accreditation standards as published by the professional organizations. Any significant change in a course or a change in a program of study is required to be approved by the respective Curriculum Committee.

General Education Requirements

Both the State University of New York and the Middle States Commission on Higher Education require students in all undergraduate programs to prepare students in a breadth of general education requirements. The general education program must include the study of quantitative and scientific reasoning, written and oral communication, critical analysis and reasoning, information literacy and technological competency, and values, ethics, and diverse perspectives.

On the basis of their upper-division status and relevant accreditation requirements, the Office of the SUNY Provost has waived several SUNY General Education requirements for undergraduate programs at Upstate Medical University. This waiver was granted based on the fact that all bachelor's degree programs are upper division and students enter with prerequisites of 60 credits, having met most of the knowledge and skill areas required by SUNY GenEd. The remaining GenEd requirements will be completed through their program of study at Upstate. The requirement for mathematics is met as a prerequisite requirement in the College of Health Professions, or by taking statistics in the College of Nursing. Other course requirements in the programs fulfill the Gen Ed distribution requirements as follows: Professional Communications, Professional & Technical Writing (Basic Communication), Research Methods, Research in Nursing (Scientific and Critical Reasoning, Information Management), and Health Care Ethics, Ethics, Nursing and the Health Professions (Values, Ethics and Diverse Perspectives).

More information about General Education Requirements at Upstate is available at:
www.upstate.edu/prospective/basics/suny_gened_requirements.php

College of Graduate Studies

The College of Graduate Studies educates students to be biomedical research scientists, preparing them for careers in academic medical centers, colleges and universities, biomedical research institutes, the biotechnology industry, and government agencies. The College educates graduate students through its six biomedical science programs, awarding PhD degrees and MS degrees as noted:

- Anatomy: MS
- Anatomy and Cell Biology: PhD
- Biochemistry: MS
- Biochemistry and Molecular Biology: PhD
- Microbiology: MS
- Microbiology and Immunology: PhD
- Neuroscience: PhD
- Pharmacology: MS and PhD
- Physiology: MS and PhD*

Not accepting applicants for 2024-2025.

The MD/PhD program at SUNY Upstate Medical University is designed for college graduates who seek the medical training and advanced research skills required for careers in academic medicine and medical research. This eight-year, dual-degree program combines our medical school (College of Medicine) with our graduate school in biomedical sciences (College of Graduate Studies).

Degree and Program Overview

Doctoral Degree

www.upstate.edu/grad/curriculum/phd_degrees.php

The PhD degree – including research, didactic course work and successful defense of a dissertation – is intended to be completed in four to six years.

First Year: All first-year students participate in three lab rotations of their choosing. Lab rotations give students exposure to diverse research environments and help them select a mentor with whom to do their dissertation research. To help students select their rotation labs, the college offers the Graduate Student Research Opportunities course during the first three weeks. In this course, representatives from each of the six biomedical sciences programs describe the research interests of their faculty members. A faculty advisor also helps students select their rotation labs. All first-year students also participate in a core curriculum designed to provide a broad- based education in the biomedical sciences. The first-year core curriculum courses are: Foundations of Molecular and Cellular Biology, covering fundamental and advanced topics in biochemistry, molecular biology and cell biology; Principles of Biostatistics, introducing the basic principles of biostatistics for research; and Journal Club where students practice analyzing papers and giving oral presentations. Beginning in January, students take electives. By the end of the spring semester, students begin focusing on research. Students select a mentor and become affiliated with their mentor's degree granting program at the end of the first year.

Second Year: By the start of the second year, most PhD students have begun work on the research project that will lead to their dissertation. During this year, students take the Responsible Conduct of Scientific Research course, which examines research ethics and the moral and philosophical issues confronting scientists and continue to take electives based on their research interests as well as courses required by their program. All students take a program specific grant writing course. Students pass a qualifying exam to become candidates for the doctoral degree. This exam is scheduled by the end of the second year.

Later Years: In their second year, students put together a dissertation advisory committee, comprised of three to six faculty members from different departments. The committee meets every six months to review the student's progress, make suggestions and provide direction. To assist in the guidance of a student's career planning, the student and advisor develop a career development plan which is updated and shared annually with the advisory committee to help a student meet their planned goal. After completing their research projects, students write a dissertation and defend it before a dissertation defense committee.

Master's Degree

www.upstate.edu/grad/curriculum/masters.php

The master's degree program typically takes two to three years to complete. Master's students participate in selected parts of the core curriculum along with PhD students. However, unlike PhD students who usually affiliate with a degree-granting program at the end of their first year, master's students join a degree-granting program from the start. Master's students write and defend a thesis, but they do not take a qualifying exam.

Additional required courses are determined by degree granting program and the advisor.

MD/PhD Program

www.upstate.edu/mdphd/curriculum/index.php

Upstate Medical University's MD/PhD Program is designed for individuals interested in pursuing a career as physician- scientists in academic medicine. During the students first part of training students complete required courses in the College of Medicine curriculum (see College of Medicine section of the Academic Catalogue). They then advance into the laboratory where they spend three to four years completing additional coursework and dissertation research under the guidance of one of the faculty members in College of Graduate Studies. The time in the laboratory culminates with the defense of the doctoral dissertation, after which students re-enter the College of Medicine to complete their training in the required clinical clerkships and electives. The total time spent in the program should be no more than eight years. Throughout the training students will also participate in MD/PhD specific coursework and activities.

Annual stipends and tuition scholarships are provided for students during enrollment in the MD/PhD program.

MD/PhD students may receive up to but no more than 12 elective credits in the College of Medicine (COM) for research which will count toward fulfilling the COM graduation requirement of 25 elective credits for students entering prior to 2023, and 32 elective credits for students entering in 2023 and beyond for the 4-year program and 19 elective credits for the 3-year program. MD/PhD students must apply for this research credit; please see the Student Handbook for details. Alternatively, MD/PhD students are eligible to apply up to 9 credits from the Grand Rounds Course towards College of Medicine elective credits (see above).

There can be 24 credits transferred from the COM to the College of Graduate Studies (CGS). These credits are based on criteria set forth by the Graduate Programs, the Dean of College of Graduate Studies, and the MD/PhD Program Director. The courses transferred are those that fulfill the CGS core curriculum and correlate with the degree-granting program in which the student is enrolled.

The MD/PhD Grand Rounds course is a required course for all students in all years of the program. MD/PhD students in the first year of their PhD are required to take the MD/PhD grant writing course.

For MD/PhD course descriptions, see below.

Prior to graduation from the program each student must have at least one accepted first-author publication of experimental data from their dissertation work in a peer-reviewed journal.

Graduate Studies Core Curriculum Course Descriptions

GS604 Graduate Student Research Opportunities
1 Credit Hours
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
With one full afternoon per program, each of the six PhD training programs will describe its currently active research projects. This description will be presented in a format which the program's faculty feels best displays all its research activities. Two major goals of these presentations are to: 1) acquaint the incoming graduate students with the breadth of research being pursued within each graduate program, and 2) to thereby give the incoming graduate students further information upon which to base their own choice of research area and advisor for their dissertations.

GS612 Biomedical Sciences Laboratory Rotations
2 Credit Hours/Rotation
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
The purpose of this rotation is to learn new research skills and more about the research of a potential dissertation advisor, and to potentially lay the groundwork for a future dissertation. Biomedical Sciences PhD students are required to do three laboratory rotations, taken consecutively, in the first year. Rotations begin approximately September, January and March. An optional fourth rotation in the summer may be taken. MD/PhD students are required to do two laboratory rotations, one each summer prior to their medical school years one and two (an optional third rotation may be taken). Written report due to Advisor at the end of each rotation.

GS616 Foundations of Molecular and Cellular Biology
3 Credit Hours
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
This course provides a comprehensive background for students in the Biomedical Sciences Program. It covers fundamental and advanced topics in biochemistry, molecular biology, and cell biology. Lectures and discussions are based on primary research articles, reference books, and lecture notes. Major divisions of the course are 1) properties of biomolecules, 2) cell organization and regulation, and 3) cell function.

GS637 Responsible Conduct of Scientific Research (Research Ethics) 2 Credit Hours
Semester Offered: Fall
Prerequisites: None
Textbook(s): Francis L. Macrina, Scientific Integrity, 4th edition
The faculty instructors participate in lecture and discussion with the students. The lecture topics include Authorship, Peer Review and Plagiarism, Conflicts of Interest, Policies on Research Misconduct, Human Subjects, Animal Subjects, and Intellectual Property.

GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
1 Credit Hour
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
This course gives students the opportunity to read, critically evaluate, and present research articles in a variety of fields. During this course, students are expected to develop a high standard of scientific analysis and good public presentation skills. At the beginning of the semester, students will be assigned to one of four subgroups according to their preference and available space. The topic areas are determined by the instructors and each subgroup will operate independently. Students will be required to present one assigned research paper. When not presenting, students will be expected to critically read the paper and submit questions in advance, and to actively participate in class discussions. Students will also gain experience in peer-review by submitting comments to the presenter on strengths and weaknesses of each presentation. This course is required for all first year graduate students in the fall semester, but, if space is available, it is also offered as an elective for advanced students.

GS690 Experimental Design and Analysis
2 Credit Hours
Semester Offered: Fall
This course introduces experimental design and analysis principles using a combination of online instruction, and in-person instruction. Students will learn to prepare an experimental plan and select appropriate methods to generate unbiased, reproducible results. Statistical methodology used in biomedical research will be

covered, integrating examples from the literature and faculty labs and hands-on learning with a statistical software package (GraphPad Prism). Lastly, students will learn how to build compelling research stories, generate concise and effective slides, and present their results clearly in oral presentations. Students will apply the approaches learned in the course to design and analyze a research dataset, culminating in a final recorded presentation and peer feedback. Grading assessment will be based on quizzes and a final presentation. Prerequisites: None. Textbook: TBD.

For additional Graduate Studies general electives, see course descriptions listed below.

Biochemistry and Molecular Biology Program and Degree Requirements

CIP Code: 26.0202

This program awards:

- PhD in Biochemistry and Molecular Biology
- MS in Biochemistry

Faculty researchers in Biochemistry and Molecular Biology seek to understand the molecular and cellular bases of human health and disease. They apply a broad range of tools ranging from those of structural biology and biophysics to cell biology and genetics. Faculty with expertise in X-ray crystallography, single-molecule electron microscopy, and spectroscopy investigate protein structure, folding, and interactions at the atomic level. Other faculty members employ modern genetics and genomic technologies to integrate the above information with in vivo studies to generate a broader understanding of cellular pathways and systems biology. This comprehensive strategy is reflected by the diverse approaches that our researchers take, from high-resolution structural and single- molecule studies to the use of animals and single-celled organisms to model disease processes and development.

Areas of focus in the Department of Biochemistry and Molecular Biology include membrane and transport protein structure and function, DNA replication and transcription, cellular responses to stress, epigenetics and energy metabolism. These studies impact disorders from cancer to neurodegenerative diseases to pathogenic infections. Our program boasts a robust and long-standing record of extramural funding, particularly from the National Institutes of Health.

PhD Degree Requirements:

Required Graduate Courses:

GS604 Graduate Student Research Opportunities
GS616 Foundations of Molecular and Cellular Biology
GS690 Experimental Design & Analysis
GS637 Responsible Conduct of Scientific Research
GS612 Biomedical Sciences Laboratory Rotations (x3)
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
B617 Methods of Biochemistry and Molecular Biology Research
B620 Biochemistry Seminar
B648 Research Design in Biochemistry and Molecular Biology
B650 Scientific Writing in Biochemistry

Electives: At least 6 credits of Advanced Biochemistry and Molecular Biology elective courses are required. (Note: GS628 Systems Biology of Genetics, Genomics, and Proteomics and PHA615 Apoptosis and Cancer Pharmacology are considered advanced Biochemistry and Molecular Biology courses for this purpose).

Total 90 credit hours (a minimum of 30 Didactic Graduate Course credit hours and a minimum of 30 Research Graduate Course credit hours).

Qualifying Examination (to be scheduled before or during the summer following the student's second year)

Dissertation Advisory Committee Meetings and Department Research Talk (minimum of one meeting every six months)

Successful Dissertation Defense

MS Degree Requirements:

Required Graduate Courses:

GS604 Graduate Student Research Opportunities
GS616 Foundations of Molecular and Cellular Biology
GS637 Responsible Conduct of Scientific Research
B609 Biochemistry and Molecular Biology Rotations
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
B620 Biochemistry Seminar

Electives:
At least 3 credits of Advanced Biochemistry and Molecular Biology elective courses are required.

Total 30 credit hours (a minimum of 20 Didactic Graduate Course credit hours and a minimum of 10 Research Graduate Course credit hours).

MS Thesis Committee Meetings (minimum of two meetings per year)

Successful Thesis Defense

Course Descriptions

B609 Biochemistry and Molecular Biology Rotations
1 Credit Hour
Course Coordinator(s): Dr. Patricia Kane
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
This laboratory course is primarily intended for Biochemistry graduate students. The course will provide instruction in laboratory techniques commonly used in biochemical and molecular biological laboratories and will aid students in the selection of a research advisor. This course is offered year-round. Research areas covered span the interests of Biochemistry and Molecular Biology program faculty. The grading for laboratory rotations is satisfactory/ unsatisfactory.

B617 Methods of Biochemistry and Molecular Biology Research
Variable Credit Hours
Semester Offered: By arrangement only
Prerequisites: GS612
Textbook(s): None
This course deals with individualized laboratory experience. Topics agreed upon by student and faculty sponsor. Often taken between rotations and Thesis research to fulfill credit requirements.

B620 Biochemistry Seminar
0 Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Presentations of recent research activities by invited speakers and department members.

B638 Independent Study in Biochemistry and Molecular Biology
1-2 Variable Credit Hours
Semester Offered: Year round
Prerequisites: General biochemistry or equivalent
Textbook(s): None
This is a tutorial course designed for graduate students in biochemistry, or related disciplines that will involve in-depth review of recent developments in biochemical research. May include 1) literature searches, 2) seminar and/or lectures, 3) hands on experience with new techniques available in the department, and 4) a written report. The purpose of the course is to develop a broad knowledge of the biochemical literature as the student advances in his/her more defined research goals.

B647 Gene Expression and Epigenetic Regulation
2 Credit Hours
Semester Offered: Spring, even years
Prerequisites: Background in biochemistry and molecular biology
Textbook(s): None
Gene expression is a fundamental process in all living organisms. Regulation of gene expression determines cell type during development and is required for cells to carry out their functions in response to nutritional, hormonal and environmental signals. At the heart of gene expression is the process of transcribing DNA into RNA. In this course, we will discuss the detailed mechanisms of transcription with a particular emphasis on the role of epigenetic modifications of chromatin in the regulation of transcription. We will use knowledge obtained from the study of a variety of model organisms to illustrate the basic concepts that are conserved throughout evolution, including (but not limited to) the role of histone modifications, chromatin remodeling, the CTD code, non-coding regulatory RNAs, and mechanisms of cell memory. In addition, we will discuss the role of epigenetic mechanisms in imprinting, iPS cell reprogramming, and human disease. The course is organized into both lecture and discussion groups, with opportunities for student participation and presentations. Readings will include contemporary studies from the published literature. .

B648 Research Design in Biochemistry and Molecular Biology
3 Credit Hours
Semester Offered: Spring
Prerequisites: General biochemistry or equivalent and with course coordinator approval.
Textbook(s): None
This course promotes the development of critical thinking, experimental design and scientific writing important to the students' future career as scientists. The students will develop an original dissertation research project, present their project aims in a "chalk talk", and prepare the plan in a formal hypothesis-based research proposal. Students will learn the essential features of grant writing, with the emphasis on developing skills necessary for effectively designing communicating their research.

B650 Scientific Writing in Biochemistry
1 Credit Hour
Semester Offered: Fall
Prerequisites: First year core curriculum
Textbook(s): None
This course is required in the second year for all students performing their thesis research in the Department of Biochemistry and Molecular Biology. The purpose is to prepare students for writing scientific papers, grant proposals, peer reviews, and written components of qualifying exams. Each of the 4-6 program instructors will assign the student a writing task that emphasizes an aspect of composition, e.g., critical evaluation of scientific literature, ability to summarize scientific concepts clearly and succinctly, sentence and paragraph structure, or other elements of style. Students will have 10 days to write the first draft, meet with the instructor one-on-one, and submit the final draft. Grading is satisfactory/unsatisfactory.

B664 Protein Sorting and Vesicular Trafficking
1 Credit Hour
Semester Offered: Spring, even years
Prerequisites:GS616 or permission of instructor
Textbook(s): None
The current literature is used to analyze recent discoveries and controversies in protein sorting and trafficking. After an initial review of core material related to the topic, students are assigned papers to read in advance of each class along with questions to think about in relation to the reading assignment. Each class consists of a student presentation(s) of the assigned paper(s) and class discussion of the readings. Grading is based on presentation and class participation.

B665 Bioenergetics and Metabolism
2 Credit Hours
Semester Offered: Spring, odd years
Prerequisites: None
Textbook(s): None
This course is taught by Biochemistry faculty specialized in bioenergetics and metabolism. Using both lecture and student-driven discussions, basic principles of metabolism will be discussed and applied in a variety of disease states. This course covers topics including mitochondrial signaling, energy metabolism, nutrient and energy sensing, pH homeostasis, cell signaling in cancer, hypoxia signaling, and oncometabolites in epigenetic regulation.

B666 Protein Structure Determination
2 Credit Hours
Semester Offered: Spring, even years
Prerequisites: None
Textbook(s): None
The primary literature and lecture handouts will be used to cover advanced topics in structure determination and dynamics of biological macromolecules. Topics include structure and dynamics by X-ray crystallography, nuclear magnetic resonance (NMR) spectroscopy, cryo electron microscopy, optical super resolution microscopy, fluorescence and circular dichroism spectroscopy, mass spectrometry, analytical ultracentrifugation, and computational methods. Emphasis is placed on how structure and dynamics of proteins relates to their function and mechanism. Grading is based on homework assignments, paper presentation, and class participation.

B669 FIJI Bootcamp: What you can and cannot do in quantitative image analysis
1 Credit Hour
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
The objective of this course is to develop skills for critically evaluating scientific images and to when and why to perform several basic analyses for movies and images collected on light microscopes. This course uses the powerful (open source) image analysis program FIJI (Fiji is just ImageJ) to apply basic image acquisition and quantification principles to scientific data (digital images).

B700 Research in Biochemistry
Variable Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Original thesis research in the field of Biochemistry under the supervision of a member of the staff.

Cell and Developmental Biology Program and Degree Requirements

CIP Code: 26.0403

This program awards:

- PhD in Anatomy and Cell Biology
- MS in Anatomy

Research in the Department of Cell and Developmental Biology explores the molecular and biochemical mechanisms of cellular function and development. Faculty researchers in the department have funding for fundamental studies of: proteins and structures responsible for the assembly and dynamics of myofibrils; the genetics and cell biology of heart formation; the role of class I myosins in kidney functions; the mechanisms of actin assembly during endocytosis; the role of cell adhesion in regulating the cytoskeleton and cell motility in normal and cancerous cells; integrin regulation of the actin cytoskeleton; research on neural plasticity and spinal cord injury; the role of formins in the assembly of the actin cytoskeleton; the identification of genes important for the assembly and motility of cilia; the interface between cytoskeletal dynamics, mitotic signaling, and membrane transport during cell division. Models used in the research include zebrafish, avian embryos, the alga *C. reinhardtii*, cell culture lines, *C. elegans*, the yeast *S. pombe*, rats and mice. Students and faculty use a variety of research methods including sophisticated light microscopy (laser scanning confocal microscopy, spinning disc confocal microscopy, wide field deconvolution imaging, real-time fluorescence microscopy, TIRF microscopy), high-sensitivity digital cameras and image processing, electron microscopy, tissue culture, stereotactic surgery, and a complete range of molecular and biochemical techniques.

PhD Degree Requirements:

Required Graduate Courses:
GS604 Graduate Student Research Opportunities
A617 Methods of Cell and Developmental Research
A623 Grant Writing in Cell and Developmental Biology
A624 Seminar in Cell and Developmental Biology
GS612 Biomedical Sciences Lab Rotations (x3)
GS616 Foundations of Molecular and Cellular Biology
GS690 Experimental Design & Analysis
GS637 Responsible Conduct of Scientific Research
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club

Electives:
GS628 Systems Biology of Genetics, Genomics, Proteomics
A613 Graduate Cellular Anatomy
A614 Contemporary Cellular, Molecular, and Developmental Biology
A615.5 Teaching in Graduate Cellular Anatomy
A621 Neuroanatomy Lab
A622 Developmental Biology
B647 Gene Expression and Epigenetic Regulation
B664 Protein Sorting and Vesicular Trafficking
B666 Protein Structure Determination
N620 Advanced Topics in Receptors and Cell Signaling
N623 Systems Neuroscience
PHA615 Apoptosis and Cancer Pharmacology

Total 90 credit hours (a minimum of 30 Didactic Graduate Course credit hours and a minimum of 30 Research Graduate Course credit hours).

Qualifying Examination (to be completed by the end of the second year)

30 min Departmental Seminar (to be presented within 6 months of qualifying exam)

Department Seminar Series (attendance required at all seminars)

Dissertation Advisory Committee Meetings (minimum of one meeting every six months)

Successful Dissertation Defense

MS Degree Requirements:

Required Graduate Courses:
GS604 Graduate Student Research Opportunities
GS616 Foundations of Molecular and Cellular Biology
A624 Seminar in Cell and Developmental Biology
GS690 Experimental Design & Analysis
GS637 Responsible Conduct of Scientific Research
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club

Electives:
GS628 Systems Biology of Genetics, Genomics Proteomics
A613 Graduate Cellular Anatomy
A614 Contemporary Cellular, Molecular, and Developmental Biology
A617 Methods of Cell and Developmental Research

A621 Neuroanatomy Lab
A622 Developmental Biology
B664 Protein Sorting and Vesicular Trafficking
B666 Protein Structure Determination
N620 Advanced Topics in Receptors and Cell Signaling
N623 Systems Neuroscience
PHA615 Apoptosis and Cancer Pharmacology

Total 30 credit hours (a minimum of 20 Didactic Graduate Course credit hours and a minimum of 10 Research Graduate Course credit hours).

Department Seminar Series

Successful Thesis Defense

Course Descriptions

A613 Graduate Cellular Anatomy
2 Credit Hours
Semester Offered: Spring, even years
Prerequisites: First year core curriculum
Textbook(s): A combined text and color atlas of histology (examples Junquiera, Ross, Wheater, or Kerr)
Graduate Cellular Anatomy provides an opportunity for graduate students to independently visualize cells, tissues, and organs of the human body by direct light microscopic observation of prepared histologic specimens and develop their teaching and presentation skills. Introductory lectures on the histology of the basic tissue types will be followed by a guided laboratory session where each student will use their own university microscope to explore these tissue types. Course participants will select organ systems of interest and prepare presentations on the histology of those organ systems and present it to the class. Student presentations will also be followed by a laboratory session for students to explore that organ system.

A614 Contemporary Cellular, Molecular and Developmental Biology
2 Credit Hours
Semester Offered: Fall, odd years
Prerequisites: A622 or with course coordinator approval
Textbook(s): None
This is an advanced course that will use discussions of primary literature, research seminars, and student presentations to explore hypotheses, mechanisms, and methodologies in cellular, molecular, and developmental biology.

A615.5 Teaching in Graduate Cellular Anatomy
2 Credit Hours
Semester Offered: By arrangement only
Prerequisites: A517 or A613
Textbook(s): None
This course will provide an opportunity for graduate students to teach a graduate level course through assisting the faculty instructors of Graduate Cellular Anatomy.

A617 Methods of Cell and Developmental Research
Variable Credit Hours
Semester Offered: By arrangement only
Prerequisites: Course coordinator approval
Textbook(s): None
Methods of research used by the faculty are demonstrated. Problem design and research methods emphasized.

A621 Neuroanatomy Lab
2 Credit Hours
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
Using a case-based format, this course will provide students an appreciation for the structure and three-dimensional organization of the central nervous system including external and internal anatomy of the central nervous system, functional organization and interconnections of the major brain pathways.

A622 Developmental Biology
2 Credit Hours
Semester Offered: Spring, odd years
Prerequisites: GS616
Textbook(s): Scott Gilbert, *Developmental Biology*, 10th edition
This is an introductory graduate course in developmental biology. The course will have two 90-minute sessions per week for 10 weeks. A team of faculty with a broad range of expertise will give lectures that introduce key concepts in developmental biology. In addition, faculty will moderate discussions of primary literature. Each student will give one Journal Club-style presentation of an assigned research article. Grades will be based on effectiveness of the presentation, performance on short quizzes, and participation in class discussions.

A623 Grant Writing in Cell and Developmental Biology
2 Credit Hours
Semester Offered: Spring
Prerequisites: GS616 and with course coordinator approval
Textbook(s): None
Faculty will provide an overview of grant writing style and mechanics and provide examples of grants written in common formats for private and government agencies. Students will write their own grants, limited to ten pages, excluding Abstract and Bibliography, and otherwise following the style of the current NIH R01 grant. Each mentor-student pair may follow their own timetable towards completion by semester's end. Students and mentors are encouraged to review writing progress and provide feedback frequently.

A624 Seminar in Cell and Developmental Biology
1 Credit Hour
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Graduate students and faculty will meet throughout the year to participate in formal public seminars. Seminars will be given by invited speakers, faculty candidates, department faculty and students. Students are required to present a 30-minute seminar on their research within six months of passing their qualifying exam and at least one 30 minute research seminar annually thereafter. Students will receive written, constructive feedback on their presentations from both faculty and students. It is recommended

that student presentations are coordinated with their thesis advisory committee meetings when possible. Students are also expected to meet with invited speakers over lunch to discuss their research as well as career development/opportunities.

A700 Research in Cell and Developmental Biology
Variable Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Original dissertation research in cell and developmental biology under faculty supervision.

Microbiology and Immunology Program and Degree Requirements

CIP Code: 26.0508

This program awards:

- PhD in Microbiology and Immunology
- MS in Microbiology

Major research areas in the Department of Microbiology and Immunology are in diseases caused by viruses, the host response to infection, and the development and function of the immune system. A range of viruses are studied, including dengue virus, cytomegalovirus, varicella zoster virus, and Zika virus. The focus of virology research is on pathogenesis, gene regulation, molecular interactions between the virus and host cell, and antiviral agents. Immunology research focuses on autoimmune diseases and the role of innate and adaptive immune responses in development, infectious disease and cancer. A major focus of our immunology research is immunoreceptor signaling. Research is conducted at the molecular, biochemical, genetic and population levels with goals of developing vaccines and therapeutics of infectious diseases and cancer.

PhD Requirements:

Required Graduate Courses:
First and Second Years:

GS604	Graduate Student Research Opportunities
GS612	Biomedical Sciences Laboratory Rotations (x3)
GS616	Foundations of Molecular and Cellular Biology
GS690	Experimental Design & Analysis
GS892	Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
GS637	Responsible Conduct of Scientific Research
M627	Introduction to Virology
M628	Introduction to Immunology
M616	Current Concepts in Virology*
M610	Advanced Immunology*
M630	Seminar in Microbiology and Immunology
M623	Directed Individual Study in Microbiological and Immunological Research Methods
M609	Grant Writing in Microbiology and Immunology

Third Year & Following Years:

M700	Research in Microbiology and Immunology
M630	Seminar in Microbiology and Immunology

**Students must take either 6 credits of both M616 and M610 or 3 credits of one of these advanced courses plus 3 credits of another advanced course offered by College of Graduate Studies degree-granting programs.*

Total 90 credit hours (a minimum of 30 Didactic Graduate Course credit hours and a minimum of 30 Research Graduate Course credit hours).

Qualifying Examination (to be scheduled by the end of the second year)

Dissertation Advisory Committee - The committee must meet at least twice per year during the dissertation research period, and committee must sign-off on student's readiness to write & defend dissertation.

Submission of First Author (or Co-First Author) Research Paper - Students in Microbiology and Immunology are required to submit at least one first-author or co-first-author research paper for publication prior to the Dissertation Defense.

Successful Dissertation Defense

MS Requirements:

Required Graduate Courses:
First and Second Years:

GS604	Graduate Student Research Opportunities
GS616	Foundations of Molecular and Cellular Biology
GS690	Experimental Design & Analysis
GS892	Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
GS637	Responsible Conduct of Scientific Research
M627	Introduction to Virology
M628	Introduction to Immunology
M616	Current Concepts in Virology*
M610	Advanced Immunology*
M630	Seminar in Microbiology and Immunology
M623	Directed Individual Study in Microbiological and Immunological Research Methods

Electives:

M609	Grant Writing in Microbiology and Immunology

Total 30 credit hours (a minimum of 20 Didactic Graduate Course credit hours and a minimum of 10 Research Graduate Course credit hours).

Successful Thesis Defense

Course Descriptions

M609 Grant Writing in Microbiology and Immunology
3 Credit Hours
Prerequisites: Thesis advisor must be chosen.
Textbook(s): None
Students will learn the essential features of writing research proposals, with an emphasis on the requirements of the NIH. In the first half of the course the principles of clear, unambiguous writing will be presented in lectures, accompanied by analysis of good and bad examples. In the second half of the course the students will meet regularly with the course instructor to review their assignments, which will then be revised as necessary in the final sessions of the course the students will meet as a group to review and discuss each other's proposals.

M610 Advanced Immunology
3 Credit Hours
Semester Offered: Fall
Prerequisites: M628
Textbook(s): Janeway's, *Immunobiology*, 9th edition
This is an advanced immunology course that will consist of a number of modules on special topics in immunology chosen by the faculty. Typically, the first session of each module will provide an overview of the topic, and the second session will be in the form a discussion of the current literature. Students will be asked to participate during the discussion sections. At the end of the semester, each student will give an oral presentation on a special topic of their choosing. Topics will vary with faculty interests, but have included innate immune, macrophage immunity, immunometabolism, T and B lymphocytes, tumor immunity, and autoimmunity.

M616 Current Concepts in Virology
3 Credit Hours
Semester Offered: Spring
Prerequisites: M627 or equivalent course of basic virology and GS616
Textbook(s): None
The structure, function and replication of important virus groups will be studied. Current research topics and techniques will be reviewed, with an emphasis on molecular and cellular biology, viral pathogenesis, and anti-viral therapy.

M623 Directed Individual Study in Microbiological and Immunological Research Methods
Variable Credit Hours
Semester Offered: By arrangement only
Prerequisites: Declaration in the Microbiology and Immunology program or with program director approval
Textbook(s): None
This is a special research training program designed to acquaint students with specific areas of research and/or use of methods, techniques, or instrumentation, as well as to introduce students intensively to the laboratory, and research approaches.

M626 Methods of Microbiology and Immunology Research
Variable Credit Hours
Semester Offered: By arrangement only
Prerequisites: GS612 or with course coordinator approval
Textbook(s): None
Methods of Research used by the faculty are demonstrated. Problem design and research methods are emphasized. Course deals with individualized laboratory experience. Topics agreed upon by student and faculty sponsor.

M627 Introduction to Virology
2 Credit Hours
Semester Offered: Spring
Prerequisites: At least one course in Biochemistry and Molecular Biology.
Textbook(s): S.J. Fint, et al., *Principles in Virology: Molecular Biology, Pathogenesis, and Control*, 4th edition (2017).
This is an introductory course in virology for graduate students. The objectives are to understand the structure and characteristics of viruses, their replication, interactions with the host, and applications in biomedical science. The material will be presented as lectures and in discussion of primary research articles.

M628 Introduction to Immunology
2 Credit Hours
Semester Offered: Spring
Prerequisites: At least one course in Biochemistry and Molecular Biology
Textbook(s): K. Murphy and C. Weaver, Janeway's, *Immunobiology*, 10th edition
This course is intended to be an introductory course in immunology for graduate students. The course goal is to develop a general understanding of immunology including both adaptive and innate immunity.

M630 Seminar in Microbiology and Immunology
1 Credit Hour
Semester Offered: Year round
Prerequisites: At least one microbiology and immunology course
or with course coordinator approval
Textbook(s): None
Faculty and students will present their research work, in a selected subject area. Meetings will be once a week lasting 60 minutes per session.

M700 Research in Microbiology
Variable Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Original research in microbiology for doctoral dissertation.

Neuroscience Program and Degree Requirements

CIP Code: 26.1501

This program awards:

- PhD in Neuroscience

The Neuroscience Graduate Program is a multidisciplinary program divided into three areas: Cell and Molecular Neuroscience, Development and Regeneration, and Systems Neuroscience. Program research relates to many human diseases and disorders, including fetal alcohol syndrome, retinitis pigmentosa, spinal cord injury, Alzheimer's, multiple sclerosis, cerebral palsy and amyotrophic lateral sclerosis (ALS). Research in Cell and Molecular Neuroscience group the regulation of gene expression in the nervous system, mechanisms of cell signaling and excitability within cells, and the molecular bases of neurological disease and disorders. Research topics in Development and Regeneration include the development of the mammalian cortex, regulation of gene expression during development, neuronal stem cells in the CNS and the eye, and mechanisms of regeneration in the retina, and the spinal cord. Research in Systems Neuroscience focuses on the neural mechanisms that underlie the functions of the olfactory system, the visual system, and motor systems in health and disease. Students can take advantage of a collaborative neuroscience program with neighboring Syracuse University.

PhD Requirements:

Required Didactic Courses (minimum of 30 credits):
The didactic credits requirement is satisfied through 15 credits of required GS coursework and 15 or more credits of Neuroscience courses (up to 2 credits of non-NS courses are accepted without petition).

Required Graduate Courses:

GS604 Graduate Student Research Opportunities
GS612 Biomedical Sciences Laboratory Rotations (x3) OR
N675 Research Rotations in Neuroscience (x3)
GS616 Foundations of Molecular and Cellular Biology
GS690 Experimental Design & Analysis
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
GS637 Responsible Conduct of Scientific Research
N601 Neuroscience
N627 Fundamentals of Grant and Fellowship Applications
N701 Seminar in Neuroscience

Electives:

N605 Welcome to Neuroscience
N610 Topics in Developmental Neurobiology
N616 Topics in Vision I
N617 Methods of Neuroscience Research
N618 Topics in Vision II
N619 Neurobiology of Disease
N620 Advanced Topics in Receptors and Cell Signaling
N621 Neuroanatomy Lab (same as A621)
N623 Systems Neuroscience
N628 Neurobiology of Addiction
N629 Scientific Writing in Neuroscience and Physiology
N630 Independent Study in Neuroscience
N631 Topics in Neuroscience (only open to 1st Year students)
N653 Topics in Cellular and Molecular Neurobiology

Total 90 credit hours (a minimum of 30 Didactic Graduate Course credit hours and a minimum of 30 Research Graduate Course credit hours).

Qualifying Examination – to be completed by the end of the second year.

Each student in the Neuroscience Graduate Program is required to attend the complete seminar series and to present a seminar to the members of the Program each year.

Dissertation Advisory Committee Meetings (minimum of one meeting every six months). Successful Dissertation Defense

Course Descriptions

N601 Neuroscience
3 Credit Hours
Semester Offered: Spring
Prerequisites: None
Textbook(s): TBD
Detailed analysis of the anatomy, physiology, and chemistry of the nervous system and behaviors that it mediates. Topics include neurons and electrochemical properties of neurons, sensory and motor systems, homeostasis, sleep consciousness, learning, and memory.

N605 Welcome to Neuroscience
1 Credit Hour
Semester Offered: Spring
Prerequisites: GS616 or MS1 Curriculum
Textbook(s): *The Mind's Machine. Foundations of Brain and Behavior, 4th Edition, Watson and Breedlove, Sinauer Associates.*
This course will introduce cellular and molecular neuroscience, emphasizing concepts and intuitive understanding. The course will start with basic information on the anatomical organization of the nervous system and the structure of neuronal and glial cells. This will be followed with fundamental intuitions in electrophysiology and synaptic function and culminate in neuronal plasticity and synaptic basis of learning and memory. Students will have opportunities to enhance core competencies by presenting and discussing some of the landmark findings in neuroscience. Course performance will be assessed through weekly short quizzes and classroom participation.

N610 Topics in Developmental Neurobiology
2 Credit Hours
Semester Offered: Fall, even years
Prerequisites: N601
Textbook(s): None
This course will provide extensive, yet selective, exposure to major issues and events in the development of the nervous system. Topics include Axis determination and early patterning, Developmental signals and gene regulation, Cell generation /proliferation, Cell migration and guidance, Cell death, Synaptogenesis, and Plasticity.

N616 Topics in Vision I
2 Credit Hours
Semester Offered: Fall, odd years
Prerequisites: N601 strongly recommended
Textbook(s): None
This course is a comprehensive study of the eye and visual system. We will examine neuroanatomical, electrophysiological, developmental and evolutionary aspects of vision. The course is a combination of didactic lecture and problem-based learning. Course source material is largely from the original scientific literature. It is particularly appropriate for graduate students intending to conduct original research in the visual system.

N617 Methods of Neuroscience Research
1 Credit Hour
Semester Offered: Spring
Prerequisites: GS616
Textbook(s): None
Survey of research methods in neuroscience. Course will include modules on the study of gene expression, morphology of neurons and glia cells, neuronal and glial function, behavior, networks, inheritance, etc. Emphasis is on experimental design, research protocols and data interpretations. Most modules will include both study of theory and actual hands-on practice through in-lab demonstrations of research methods.

N618 Topics in Vision II
2 Credit Hours
Semester Offered: Spring, by arrangement only
Prerequisites: N623 strongly encouraged
Textbook(s): None
The course will examine neuroanatomical, electrophysiological, and psychophysical aspects of vision. This is primarily a readings course, with emphasis on original literature. It is particularly appropriate for graduate students intending to conduct original research in the visual system. This second half will focus on visual mechanisms beyond the level of the retina, focusing on the cortical contributions to visual processing and visually guided behavior.

N619 Neurobiology of Disease
2 Credit Hours
Semester Offered: Fall, odd years
Prerequisites: None
Textbook(s): None
This course is focused on the fundamental biological mechanisms of neurological and neuropsychiatric diseases such as Alzheimer's disease and schizophrenia.

N620 Advanced Topics in Receptors and Cell Signaling
1 Credit Hour
Semester Offered: Fall
Prerequisites: First year core curriculum
Textbook: None
This advanced course will cover topics in receptors and cell signaling; for example, Netrin signaling, integrins and cell adhesion, tyrosine kinase-linked receptors, and scaffolding proteins. Topics will be covered by a combination of graduate student-specific lectures and tutorials, based on current research papers and associated reviews. Each topic will also include a take-home essay-type examination.

N621 Neuroanatomy Lab
1 Credit Hour
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
Using a case-based format, this course will provide students an appreciation for the structure and three-dimensional organization of the central nervous system including external and internal anatomy of the central nervous system, functional organization and interconnections of the major brain pathways.

N623 Systems Neuroscience
2 Credit Hours
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
An exploration of issues and themes in systems neuroscience, focusing on the cooperativity of neurons in circuits, ensembles, representations and pathways, leading to sensation, perception, information processing, cognition and behavior. Course format includes lectures and discussion. Readings include selected textbook chapters and reviews as well as in-depth analysis of original literature. This is an introductory graduate level course that does not assume prior exposure to systems neuroscience beyond the level of N507.

N627 Fundamentals of Grant and Fellowship Applications
3 Credit Hours
Semester Offered: Spring
Prerequisites: Second year standing or equivalent (students must be already pursuing a doctoral project assigned by their advisor, must have completed N601, N629 or equivalent experience in scientific writing recommended
Textbook(s): None
The primary goal of the course is to teach the rationale and preparation of a grant or fellowship application, using the current formats for NIH R-type grants and F-type fellowships. The course is divided into 3 major sections. An introductory section describes the structure of grant and fellowship applications as well as the process of review and discussion. In section 2, the students will prepare their own applications by working with the course coordinator and their own advisors, following an intensive schedule of written assignments that must be completed and reviewed within deadlines. In section 3, the students will learn the major components of an F-type fellowship application and will prepare their NIH-style biosketch. The course requires writing a mock-grant application package to be submitted for external reviews. The students must discuss the resulting reviews and submit a compiled and revised application to achieve a final passing grade. The final mock-grant application will be used by the students to prepare part of the written portion of their qualifying exam.

N630 Independent Study in Neuroscience
1 – 3 Variable Credit Hours
Semester Offered: By arrangement only
Prerequisites: N601
Textbook(s): None
This is a tutorial course designed for graduate students in Neuroscience. The purpose of the course is to develop in-depth knowledge of a field of neuroscience research as a student continues to make progress towards graduation. Student will work

with thesis advisor or another expert faculty member. Course activities may include: 1.) Literature surveys, 2.) Seminars and/or lectures, 3.) In-depth critique of literature and/or experimental techniques. Requires fulfillment of a written assignment (e.g., a review of literature for publication).

N631 Topics in Neuroscience
1 Credit Hour
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
For first year students only, this is a survey course of current research in neuroscience. Members of the Neuroscience Faculty will present specific subfields of neuroscience research focusing on major questions and recent progress. Course will combine a basic introductory lecture (focused on major questions and techniques) with a discussion session to go over a recent research paper. Students will be required to submit written questions for, and actively participate in, the discussion session. The purpose of the course is to familiarize incoming students with major research questions and experimental approaches in neuroscience research.

N653 Topics in Cellular and Molecular Neurobiology
2 Credit Hours
Semester Offered: By arrangement only
Prerequisites: First year core curriculum and N601.
Textbook(s): None
This course will discuss major issues in Molecular and Cellular Neurobiology, emphasizing contemporary approaches.

N675 Research Rotations in Neuroscience
1-5 Variable Credit Hours
Semester Offered: By arrangement only
Prerequisites: None
Textbook(s): None
Methods of research used by the faculty are demonstrated. Problem design and research methods emphasized. Course deals with individualized laboratory experience. Topics agreed upon by student and faculty sponsor.

N700 Research in Neuroscience
Variable Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Original dissertation research in Neuroscience under supervision of a Neuroscience faculty member and monitored by an advisory committee.

N701 Seminar in Neuroscience
1 Credit Hour
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Weekly seminars will be given by invited speakers, faculty candidates, program faculty, and students. Students are required to present their first 30-minute seminar during their third year in graduate school (after passing their qualifying exam), and annually thereafter. Students will receive written, constructive feedback on their presentations from program faculty and fellow students. The coordination of the students' presentations with their thesis advisory committee meetings is strongly encouraged. Students are also expected to meet with invited speakers over lunch to discuss research (the speaker's/their own) and/or career-development topics. Grades will be based on attendance, participation (e.g., questions or comments), and performance (as speakers). All students must sign in at the seminar to record their attendance.

Pharmacology
Program and Degree Requirements
CIP Code: 26.1001

This program awards:

- PhD in Pharmacology
- MS in Pharmacology

Current research in the Department of Pharmacology focuses on cancer biology, structure-based drug design, cell signaling, cardiovascular disease, neurodegeneration, stem cells, and the discovery, development and testing of novel therapeutics. This work is supported by external funding, particularly from NIH. To continue this excellent tradition in research and teaching and to keep pace with ongoing changes in pharmacology, our department is enhancing its research strengths and expanding into new research areas.

PhD Requirements:

Required Graduate Courses:
GS604 Graduate Student Research Opportunities
GS616 Foundations of Molecular and Cellular Biology
GS690 Experimental Design & Analysis
GS612 Biomedical Sciences Lab Rotations (x3)
GS637 Responsible Conduct of Scientific Research
PHA623 Grant Writing in Pharmacology
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
PHA610 Principles of Pharmacology
PHA645 Pharmacology Seminar

Electives:
PHA612 Cardiovascular Physiology and Pharmacology*
PHA615 Apoptosis and Cancer Pharmacology*
PHA618 Current Topics of Pharmacology*
PHA622 Principles and Practices of Drug Discovery and Development*

**All Pharmacology PhD students must take a minimum of 4 advanced Pharmacology course credits (including credit hours for PHA610).*

Total 90 credit hours (a minimum of 30 Didactic Graduate Course credit hours and a minimum of 30 Research Graduate Course credit hours).

Qualifying Examination – to be taken late summer of student's second year

Dissertation Advisory Committee Meetings (minimum of one meeting every six months)

Successful Dissertation Defense

MS Degree Requirements:

Required Graduate Courses:

GS604 Graduate Student Research Opportunities
GS616 Foundations of Molecular and Cellular Biology
GS690 Experimental Design & Analysis
GS637 Responsible Conduct of Scientific Research
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
PHA610 Principles of Pharmacology
PHA645 Pharmacology Seminar

Electives:

PHA612 Physiology and Pharmacology*
PHA615 Apoptosis and Cancer Pharmacology*
PHA618 Current Topics of Pharmacology
PHA622 Principles and Practices of Drug Discovery and Development*
PHA623 Grant Writing in Pharmacology

**All MS students are required to take minimum of 4 advanced Pharmacology course credits (including credit hours for PHA610). Students can take other elective courses offered by the Department of Pharmacology or by other Departments to fulfill the didactic course requirement. Also, it is suggested that students take Methods of Pharmacology Research (PHA617) in the first year (no more than 4 credits).*

Total 30 credit hours (a minimum of 20 Didactic Graduate Course credit hours and a minimum of 10 Research Graduate Course credit hours).

Successful Thesis Defense

Course Descriptions

PHA610 Principles of Pharmacology
1 Credit Hour
Semester Offered: Fall
Prerequisites: First year core curriculum
Textbook(s): None
Pharmacology is the study of how drugs react in living organisms, which is consisting of pharmacokinetics (what the body does to a drug) and pharmacodynamics (what the drug does to the body). Pharmacokinetics is the study of absorption, distribution, metabolism, and excretion of drugs (ADME). The physical, chemical and biochemical principles and the dosage (route, dose and frequency) determine the drug concentration at the site of action and the intensity of a drug's effects with time. The formulation of drugs can markedly alter the oral absorption and/or the delivery of drugs to their targeted sites of action.

Certain physiological and pathological factors may modify the pharmacokinetics of drugs via altering drug ADME. Pharmacodynamics is the study of the mechanisms of action of drugs and their biochemical and physiological effects, whereas the study of the undesirable adverse effects of drugs is toxicology. In contrast, drug/substance abuse studies how excessive use of psychoactive drugs, such as alcohol, pain medications, or illegal drugs lead to physical, social, or emotional damage. Pharmacogenomics is the study of how acquired and inherited genetic variations affect individual's drug response. Finally, special areas of pharmacology will be introduced to illustrate the application of pharmacology principles in the treatment of diseases. These principles of pharmacology will be taught in twelve 1-hour lectures, complemented by two sections of student presentations on pharmacodynamics and pharmacokinetics. A minimum of two students must register for this course to be offered.

PHA612 Cardiovascular Physiology and Pharmacology
3 Credit Hours
Semester Offered: Year round
Prerequisites: First year core curriculum
Textbook(s): None
This advanced course will cover cardiac anatomy and physiology, basic mechanisms of cardiac arrhythmias, methods of diagnostics and treatment of cardiac diseases, and the mechanisms of action of antiarrhythmic drugs. The course will be run in a small discussion group format. The group will meet once a week to discuss a set of 4-5 topics formulated by the moderator. The students are expected to study the materials independently and be prepared to give a short presentation on any of the topics to the class as well as discuss it with other members of the group.

PHA615 Apoptosis and Cancer Pharmacology
2 Credit Hours
Semester Offered: Spring
This advanced course will cover current concepts in cell death and cancer pharmacology and will specifically address the molecular actions of anti-cancer agents with emphasis on death ligands/receptors, apoptotic machinery, tumor suppressor genes, oncogenes, molecular mechanisms of chemoprevention and anti-cancer drug.

PHA617 Methods of Pharmacology Research
Variable Credit Hours
Semester Offered: By arrangement only
Prerequisites: GS612
Textbook(s): None
Methods of research used by faculty are demonstrated. Problem design and research methods are emphasized.

PHA618 Current Topics in Pharmacology
1 Credit Hour
Semester Offered: By arrangement only
Prerequisites: PHA610
Textbook(s): None
The purpose of this tutorial course is to develop a student's knowledge of Pharmacologic research as well as to provide an opportunity for focused study in areas of cell and molecular pharmacology not otherwise covered in the graduate curriculum. The course format may include selected readings, discussions with faculty, seminars, and lectures. Course content should be discussed with the faculty mentor prior to enrollment in the class, and a course outline with possible start and end dates should be prepared and approved by the Pharmacology Program Director.

PHA622 Principles and Practices of Drug Discovery and Development
1 Credit Hour
Semester Offered: Fall
Prerequisites: Course coordinator approval
Textbook(s): None
The course objective is to help students understand the overall process of drug discovery and development, structure-based drug design, combinatorial chemistry and high throughput screening in drug discovery, in vitro drug screening – identification and optimization of lead compound, mouse models for drug development, early safety and efficacy assessments, pharmacokinetics/toxicology (PK/TOX) studies in drug development, and nanotechnology in drug delivery. Students will be expected to read literatures and think critically about the objectives and experimental designs of the various stages of drug development.

PHA623 Grant Writing in Pharmacology
3 Credit Hours
Semester Offered: Spring
Prerequisites: First year core curriculum and declaration into Pharmacology department
Textbook(s): None
The primary goal is to teach critical thinking, organizational skills and proposal writing using the current NIH R21/F31 format. The course will be divided into 4 sections: (I) introductory sessions concerning the peer review process, application materials, the overall organization of the proposal, hypothesis development, and the setting of deadlines, (II) the development of Specific Aims and then the entire proposal in conjunction with thesis advisors (this will involve regular meetings and discussions between the student and advisor), (III) review and critiquing of the proposals by participating faculty and the class, (IV) revision of the proposal on the basis of critiques and completion of final version.

PHA645 Pharmacology Seminar
0 Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Graduate students and faculty will meet every week during the academic year to participate in seminars. Seminars will be given by outside speakers and Departmental members, including Graduate Students who, after their first year, will be required to give one presentation per year. Grades will be assigned based on attendance and performance.

PHA653 Pharmacology Laboratory Rotations
Variable Credit Hours
Semester Offered: Year-round
Prerequisites: None
Textbook(s): None
Students learn methods of research used by the Pharmacology Faculty. Problem design and research methods are emphasized. Written report required at end of rotation.

PHA700 Research in Pharmacology
Variable Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Original dissertation research in Pharmacology under the supervision of a Pharmacology Faculty member and monitored by an advisory committee.

Physiology Program and Degree Requirements

CIP Code: 26.0901

This program awards:

- PhD in Physiology*
- MS in Physiology**

**** Not accepting students at this time.***
*****Only accepting MD students in Upstate's College of Medicine 2024/25.***

The major research in this department includes endocrinology, exercise science, neurophysiology, and pulmonary and sensory physiology.

Since a number of the Physiology faculty hold primary appointments in clinical departments, the Physiology program is an ideal vehicle for students looking to apply basic science research techniques to clinically relevant biomedical problems such as bone tumors, diabetes, osteoporosis, kidney disease and lung disease.

Experimental approaches range from studies on whole animals and isolated tissues to studies of cellular and molecular events.

Scientific inquiry may include the complex interactions of systems in the whole individual, the orchestration of processes integrating organ and cell function, and/or integration of molecular events within individual cells.

PhD Requirements:

Required Graduate Courses:
GS604 Graduate Student Research Opportunities
GS612 Biomedical Sciences Laboratory Rotations (x3)
GS616 Foundations of Molecular and Cellular Biology
GS690 Experimental Design & Analysis
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club
GS637 Responsible Conduct of Scientific Research
PHY627 Fundamentals of Grant and Fellowship Applications
PHY659 Physiology Seminar

Total 90 credit hours (a minimum of 30 Didactic Graduate Course credit hours and a minimum of 30 Research Graduate Course credit hours).

Qualifying Examination to be scheduled at the end of the spring of the second year.

Each student in the Physiology Graduate Program is required to attend the complete seminar series and to present a seminar to the members of the Program each year.

Dissertation Advisory Committee Meetings (minimum of one meeting every six months).

Successful Dissertation Defense

MS Requirements:

GS604 Graduate Student Research Opportunities**
GS616 Foundations of Molecular and Cellular Biology ***
GS690 Experimental Design & Analysis***
GS637 Responsible Conduct of Scientific Research***
GS892 Introduction to the Presentation and Analysis of Scientific Literature: Journal Club*
PHY654 Proposal Writing for the Physiology Master's Thesis**
PHY659 Physiology Seminar
PHY617 Methods of Physiology Research
PHY700 Research in Physiology

**Either GS892 or MDPH602 is required.*
***Either GS604 or PHY654 is required.*
**** May be exempt by credits for prior learning from the MD program.*

Up to 15 credits will be applied from prior learning in the MD program toward the MS degree.
Total 30 credit hours (a minimum of 20 Didactic Graduate Course credit hours and a minimum of 10 Research Graduate Course credit hours).
Successful Thesis Defense

For medical students who have completed the Phase 1 curriculum of the MD program at SUNY Upstate and wish to complete the MS in Physiology, the coursework below is the most common way to fulfill requirements of the MS.

Course #	Title/Topic	Credits
Didactic Credits:		
PHY659	Physiology Seminar	0
PHY654	Proposal Writing for the Physiology Master's Thesis	0.5
PHY617	Methods of Physiology Research	12
MDPH602	MD/PhD Grand Rounds	1
COM Transfer Credits		≥6.5
Research Credits:		
PHY700	Research in Physiology	≥10
Total Credits:		**≥30**

Up to 15 credits will be applied from prior learning in the MD program toward the MS degree.
Total 30 credit hours (a minimum of 20 Didactic Graduate Course credit hours and a minimum of 10 Research Graduate Course credit hours).
Successful Thesis Defense

Course Descriptions

PHY617 Methods of Physiology Research
Variable Credit Hours
Semester Offered: By arrangement only
Prerequisites: GS612
Textbook(s): None
Methods of research used by the faculty are demonstrated. Problem design and research methods are emphasized. Course deals with individualized laboratory experience. Topics agreed upon by student and faculty sponsor.

PHY620 Advanced Topics in Receptors and Cell Signaling
1 Credit Hour
Semester Offered: Fall
Same as N620 above

PHY627 Fundamentals of Grant and Fellowship Applications
3 Credit Hours
Semester Offered: Spring
Same as N627 above.

PHY654 Proposal Writing for the Physiology Master's Thesis
0.5 Credit Hours
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
With help from their Research Advisor, students will select and define a research problem to be studied within the context of the Advisor's scope of ongoing research. Putting together a thoughtful proposal is an important first step in preparing both the student and advisor for successful thesis research. In addition, this process provides the Research Advisor with an early opportunity to make the student aware of fundamental background concepts before the project is underway. The written proposal will also provide the Program Director with an understanding of the possible scope of the project. The student will be expected to complete the thesis proposal as directed by the Course Coordinator and submit it to the Program Director for review within four weeks of selecting a research laboratory.

PHY659 Physiology Seminar
0 Credit Hours
Semester Offered: Year round
Prerequisites: Declaration in Physiology
Textbook(s): None
Graduate students and faculty will meet once every other week during the academic year for the purpose of discussing current topics in neuroscience and physiology and departmental research programs. Outside speakers also participate. Each graduate student is required to present a critical review of a topic in biology during a scheduled meeting. .

PHY700 Research in Physiology
Variable Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
Independent research in preparation for dissertation requirement.

Additional Graduate Courses

GS628 Systems Biology of Genetics, Genomics and Proteomics
4 Credit Hours
Semester Offered: Spring
Prerequisites: GS616
Textbook(s): None
The goal of this course is to train graduate students in modern experimental and theoretical methods of performing systems level investigations that address fundamental and clinically relevant questions in genetics, genomics and proteomics. The course is divided into 4 sections. Section 1 is an examination of the origins of living organisms, basic genome organization, the basis of genetic diversity, mitochondrial and yeast genetics, and genomic instability. Section 2 is an examination of human genetics, including linkage, association of quantitative trait analysis, as well as transcription factor analysis, epigenetics, microRNA analysis, and immunorepertoire analysis. Section 3 provides in-depth exposure in the use of next-generation sequencing and gene network analysis for monitoring gene expression, the fundamentals of proteomics and metabolomics and sequencing by mass spectrometry, as well as mouse genetics, pharmacogenetics, personalized medicine, and microbiome analysis. Section 4 concludes the course with students developing and presenting theory own systems biology research project.

GS632 Biomolecular X-Ray Diffraction: Theoretical Basis and Experimental Procedures
4 Credit Hours
Semester Offered: By arrangement only
Prerequisite: undergraduate (senior level) biochemistry, chemistry, physics or physical chemistry or permission of the course director
Textbook(s): None
An introduction to the theory and practices of X-ray diffraction and crystallographic methods applicable to the elucidation of structure-function relationships of proteins and other biological molecules and interactions thereof. The course is designed to provide a comprehensive understanding of the basic principles through in-depth theoretical discussion, extensive problem solving and hands-on experimental and computational steps through the biomolecular structure solution process.

GS638 Teaching for the Basic Scientist
2 Credit Hours
Semester Offered: Spring, odd years
Prerequisites: None
Textbook(s): None
This course is for graduate students who want to become course directors and explore the teaching track. Enrollees will learn about design, delivery and assessment of any academic course for adult learners. Students will learn to write learning objectives and plan content as well as deliver content with an emphasis on active learning. The student will also learn appropriate assessment methods that fit the delivery and objectives of the course.

GS643 Introduction to Quality and Compliance for Biotechnology
3 Credit Hours
Semester Offered: Fall, even years
Prerequisites: None
Textbook(s): None
This course provides an overview of the skills and knowledge needed to perform and oversee quality and regulatory compliance functions within the biotechnology industry. This introduction in Quality and Compliance for Biotechnology reviews Good Pharmaceuticals Industry Practice (GXP) principles, procedural guidelines, FDA, and other regulations and ethical considerations.

GS647 Nanocourses in Biomedical Sciences
0.5 Credit Hour
Semester Offered: By arrangement only
Prerequisites: None
Textbook(s): None
Nanocourses are short courses that meet for a total of ~7-8 hours and typically address a new or evolving area that is not covered by the standard graduate curriculum. The course could be given in a week or two days or even over 7 weeks. Typical nanocourses could involve new methodologies (super-resolution microscopy, microfluidics, proteomics) or could focus on a specific biological entity (exocyst) or could be practical (presenting scientific data using Photoshop and Illustrator). Course could include lecture, discussion, paper presentations, problem solving or other modalities. A full list of courses can be found at http://upstate.edu/grad/curriculum/nanocourses.php.

GS652 Advanced Dissection I
3 Credit Hours
Semester Offered: Fall
Prerequisites: PHYT601 Gross Anatomy
Textbook(s): None
This is a practical skill-based course in which students will complete specific dissections upon a cadaver under the supervision of the course director. Course director will provide a rubric of standards for documenting the student's skills and competencies. There will also be activities that include demonstrating prosected specimens
to the COM students, assisting COM students with their dissections, preparing and presenting teaching content with clinical applications, and conducting small group teaching in person or remotely. Each activity will be evaluated by a member of the anatomy faculty team as well as students based on a feedback form.

GS653 Advanced Dissection II
3 Credit Hours
Semester Offered: Spring
Prerequisites: PHYT601 Gross Anatomy
Textbook(s): None
This is a practical skill-based course in which students will complete specific dissections upon a cadaver under the supervision of the course director. Course director will provide a rubric of standards for documenting the student's skills and competencies. There will also be activities that include demonstrating prosected specimens to the COM students, assisting COM students with their dissections, preparing and presenting teaching content with clinical applications, and conducting small group teaching in person or remotely. Each activity will be evaluated by a member of the anatomy faculty team as well as students based on a feedback form.

GS660: Discovery Science To Patient Care
1 Credit Hour
Semester Offered: Fall
Prerequisites: None
Textbook(s): TBD
This course will involve discussions on selected topics and a book club. The topics will aim to familiarize the students with the often-serendipitous process through which basic science discoveries lead to medical applications. In addition, it is important that aspiring physicians and biomedical researchers read broadly about the history and progress of medicine as reported by respected scientists, clinicians and historians. To meet this end, students will read two books outside of class – one during the fall semester, and another during the spring semester. Students will demonstrate their engagement by taking an active role in activities and conversations focused on both aspects of the course. Various strategies will be used to encourage student participation and keep the sessions active.

GS670 Entrepreneurship and Innovation Immersion I
1 Credit Hour
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
This course will focus on what it takes to start, grow, and sustain new ventures in the biotechnology and health fields. The course will consider, and attempt to answer the questions; What is biomedical innovation? How do you translate these ideas to commercial use? To address these questions the following topics will be included: evaluating opportunities, protecting intellectual property (IP), considerations for monetizing IP through licensing and commercialization, opportunity costs and securing resources. The course will include readings, lecturers, and immersion experiences with regional biotechnology and medical device companies.

GS671 Entrepreneurship and Innovation Immersion II
1 Credit Hour
Semester Offered: Spring
Prerequisites: GS670
Textbook(s): None
This course will provide the support and mentorship to develop a business plan and "company pitch" that can be used for pitch competitions or to solicit venture capital. For eligible students it will provide a pathway for participation in the New York Business Plan Competition (NYBPC).

MD/PhD Courses:

(The courses below are unique to the MD/PhD program)

MDPH601 Research Design for Physician-Scientists
3 Credit Hours
Semester Offered: Fall
Prerequisites: None
Textbook(s): None
This course promotes the development of critical scientific writing important to the students' future career as physician-scientists. The student will gain experience in grantsmanship by writing and presenting an original hypothesis-based research proposal. Students will learn the essential features of scientific writing, with the emphasis on developing skills necessary for crafting an effective grant proposal.

MDPH602 MD/PhD Grand Rounds
Variable Credit Hours
Semester Offered: Year round
Prerequisites: None
Textbook(s): None
The MD/PhD Grand Rounds course is required for all MD/PhD students. MSI and MSII students attend Grand Rounds, read assigned papers, and participate in discussions. They are also required to present their summer research experiences. Students in their PhD years will present an assigned clinical case or research study. The student presenter is responsible for facilitating discussion surrounding the context of the basic, clinical and translational research issues of the case or study. MSIII and MSIV participation is similar to that of the student's in their PhD years. The exception is that presentations in MSIII and MSIV are based on students' fields of interest and/or personal experiences during their training. Presentation feedback is required after each presentation by all seminar attendees.

College of Health Professions

The College of Health Professions was formed in 1971, however, programs in the Health Professions have been in existence on this campus since 1956. College of Health Professions' students can choose from eight health care fields. All of the degree programs are upper division transfer programs graduate programs.

Each curriculum includes courses in professional subject areas, both didactic and clinical. The undergraduate programs include some arts and sciences coursework. The setting and structure of the College of Health Professions provide an opportunity for students in the various programs to learn to practice together as future members of the health care delivery team. The appropriate nationally recognized professional bodies accredit the professional programs, and graduates are eligible to apply to sit for licensure and/or certification immediately upon graduation.

Arts and Sciences

The presence of an Arts and Sciences division, housed within the College of Health Professions, underscores Upstate's emphasis on excellence in education and dedication to producing informed and responsible health care professionals. Faculty members offer courses in the arts and sciences to undergraduate students in the College of Health Professions and College of Nursing. These offerings include a diverse spectrum of foundation courses in biological and physical sciences, mathematics, English, social and behavioral sciences, education, as well as courses specifically designed for health professionals. Designed to complement and broaden the student's professional courses, Arts and Sciences classes serve to develop students' knowledge base, scientific awareness, social sensitivity, critical thinking and problem- solving skills.

The Arts and Sciences courses are a required component in the curricula of the undergraduate programs in the College of Health Professions and the College of Nursing. Students must successfully complete their arts and sciences courses in order to earn a university degree.

Course Descriptions

Biology

BIOC501 Biochemistry
4 Credit Hours
This course is intended to provide a general understanding of the basic principles of biochemistry with an emphasis on their relationship to medicine. Topics will include protein structure, carbohydrates, lipids, membranes, membrane transport, enzyme kinetics, metabolism and thermodynamics.

BIOC502 Cell and Molecular Biology
3 Credit Hours
This course is intended to provide a general understanding of molecular cell biology including DNA and chromosomes, transcription, protein synthesis, regulation of gene expression, cell structure, organelle function, cytoskeleton, endocytosis and exocytosis, receptors and second messengers, cell proliferation and differentiation, extracellular matrices, and cell adhesion and motility.

BIOL310 Biostatistics
3 Credit Hours
This is a basic course in statistical concepts designed to enable health science professionals to apply basic descriptive and inferential statistical techniques to problems in their field. The topics discussed include descriptive statistics, elementary probability, normal distribution, hypotheses testing, including tests, regression and correlation theories; analysis of variance (ANOVA); and chi-squared tests. The use of a computer statistical package will be emphasized.

BIOL340 Advanced Physiology
3 Credit Hours
This course covers more advanced principles of human physiology. Aspects of cellular physiology as well as the skeletal muscle, cardiovascular, respiratory, renal, gastrointestinal and endocrine systems are discussed.

BIOL379 Cell and Molecular Biology
3 Credit Hours
This course is designed to introduce the student to fundamental principles of cell biology and related concepts at the molecular level. Topics include molecular and structural organization of the eukaryotic cell, organelle structure and function, membrane structure and transport, cell communication, the cell cycle and programmed cell death, regulation of selected cell activities, cancer, and selected laboratory techniques in cell and molecular biology.

BIOL 414 Introduction to Molecular Bioinformatics
2 Credit Hours
This course introduces students to the tools and knowledge needed to access and use molecular bioinformatic approaches in research. Unit I of the course examines genetic diversity of living organisms, provides essential background on the tools and terminology used in bioinformatics, and an introduction to the genetics of mitochondria and yeast. Unit 2 explores human genetics and tools used to identify genetic variants that cause disease and focuses on elements that regulate gene expression. Unit 3 provides an overview of high throughput tools used to study gene expression, proteomics, and metabolomics in human and mouse models. This Unit culminates with an examination of metagenomic analyses, pharmacogenomics, and personalized medicine.

BIOL420 Epidemiology
3 Credit Hours
This course presents epidemiological principles and methods with emphasis on the health status and health needs of a population, on levels of prevention, and on promotion of health strategies.

BIOL451 Research Methods I
1 Credit Hour
This course provides an introduction to concepts essential to research process, theory, construction and practices, in order to assist health professionals in becoming informed and critical consumers of their professional journals and the medical research literature. Topics include literature reviews and research article critiques.

BIOL501 Human Genetics
3 Credit Hours
The course is intended to provide a general understanding of human genetics and its role in medicine including: the chromosomal basis of heredity, cytogenetics, Mendelian inheritance, population genetics, molecular diagnostics, genetic screening, human genome project, cancer genetics, mitochondrial genetics, single-gene disorders, chromosome abnormalities, and multifactorial disorders.

BIOL601 Research Methods
2 Credit Hours
This course provides an introduction and basic foundation to research process, theory, methods, practices, and statistical concepts with the goal of increasing understanding of how research knowledge is constructed. Will focus on steps involved in the "Scientific Method", an overview of quantitative, qualitative and survey methodologies, an exploration of basic types of research designs, and an introduction to descriptive and inferential statistical concepts that will provide basic skills in the descriptive analysis of quantitative data. Students will be expected to complete selected student portfolio items including a "Review of the Literature", and a "Critique of a Research Article".

BIOL602 Blood and Coagulation
1 Credit Hour
This introductory instructive course employs reading, lecture, discussion and demonstration to prepare students to understand blood. Emphasis is placed on the student's ability to describe the composition and function of blood as a vehicle for transport of materials throughout the body, the biologic mechanisms for hemostasis, laboratory techniques for collecting, storing administering blood, and test for monitoring/evaluating blood and hemostasis. Assessment focuses on the student's ability to interpret laboratory values and recommend appropriate treatments within the context of extracorporeal circulation patients.

BIOL603 Introduction to Immunology
1 Credit Hour
This introductory instructive immunology course employs video, reading, lecture and discussion to develop the student's understanding of immunology including both adaptive and innate immunity. Emphasis is placed on the student's ability to describe fundamental principles in immunology and apply them in the context of patients supported with extracorporeal circulation technologies. Assessment focuses on the student's ability to analyze the impact of extracorporeal techniques and technologies on the immune system and recommend a care plan which attenuates the systemic inflammatory response.

BIOL610 Selected Topics in Medical Physiology
4 Credit Hours
This advanced instructive physiology course is linked to the lecture component of the Medical Physiology course in the College of Medicine and employs video, reading, lecture, and discussion. Emphasis is placed on the development of the student's understanding of the cardiovascular, pulmonary and renal systems. Assessment focuses on the student's ability to describe fundamental physiologic principles, analyze physiologic data and evaluate their short term and long-term implications for the critical care patient.

BIOL614 Intro to Molecular Bioinformatics
2 Credit Hours
This course introduces the tools and background knowledge needed to utilize molecular bioinformatic approaches in research. The course begins with an exploration of the origin and analysis of genetic diversity in humans and other organisms and the tools and terminology of bioinformatics. An overview of state-of-the-art tools used to study genetic diversity, gene expression, proteomics, pharmacogenomics, and metagenomics is provided, as well as the methods for examining the association of these types of data with different diseases or traits. Graduate students will complete a capstone project related to a topic of choice covered in the course.

Chemistry

CHEM355 Biochemistry
4 Credit Hours
This course provides an overview of the structure, functions, and reactions of molecules comprising living organisms including carbohydrates, lipids, proteins, vitamins, minerals, nucleic acids as well as intermediate metabolism and enzyme mechanisms.

English

ENGL302 Foundations of Professional Communications I
0.5 Credit Hour
This course is the first course in a two- course sequence that prepares students entering the health professions in the essential areas of professional communication and will be linked to courses identified by the Department of the student's major area of study. Specifically, course objectives will include optimizing student ability to produce coherent texts within common college-level written forms, demonstrate the ability to revise and improve such texts, research a topic, develop an argument and organize supporting details, and develop proficiency in oral discourse.

ENGL303 Foundation of Professional Communications II
0.5 Credit Hour
This course is the second course in a two- course sequence that prepares students entering the health professions in the essential areas of professional communication and will also be linked to courses identified by the Department of the student's major area of study. Course objectives and assignments will vary by program of study, and will be dependent on what has previously been accomplished in the context of ENGL302 Foundations of Professional Communications I.

ENGL325 Professional and Technical Writing
3 Credit Hours
This course is founded on the premise that knowing how to use language in various oral and written forms builds skill in research, in reasoning, and in problem solving.
Topics include how to create professional written documents such as: memoranda, reports, abstracts, reviews of professional texts, business letters, and résumés. Emphasis is placed on student ability to produce coherent texts, demonstrate the ability to revise and improve such texts, and write a formal proposal or research article.

ENGL332 Understanding the Patient Perspective in Literature
3 Credit Hours
This course is designed for nurses and other health care professionals. One important aspect of effectively treating patients is being able to empathize with the challenges and struggles of patients dealing with difficult diseases and injuries. In this class, students will read and respond to novels written from the patient perspective.

ENGL333 Perceiving the Healthcare Profession Through Children's Literature
3 Credit Hours
This course uses an inclusive and multicultural approach to studying children's literature for its social, emotional, educational, and literary values. Designed for healthcare professionals, this course will begin by exploring the characteristics and traits of a number of genres such as fairy tales, humor, poetry, realistic fiction, non- fiction, graphic novels, and fantasy. The course will then focus specifically on how healthcare-related topics such as doctor visits, illness, experiencing the death of a loved one, mental illness, learning disabilities, and the grief process can be presented to children through quality literature.

ENGL632 Understanding the Patient Perspective in Literature
3 Credit Hours
This course is designed for graduate students in health professions that involve patient care. One important aspect of effective health care is being able to empathize with challenges and struggles of patients dealing with difficult diseases and injuries. In this class, students will read, respond to, and write about novels written from the patient perspective. They will apply the insight gained from the readings to their clinical education and practice.

Pathology

PATH360 Pathology
3 Credit Hours
This course covers basis pathologic mechanisms and specific diseases/disorders affecting the major organ systems of the human body. Commonly encountered diseases/disorders will be covered in detail. Pathophysiologic mechanisms and concepts are included, especially for most commonly encountered disease states. Topics such as genetics/heredity, immune system disease, and malignant processes are presented as well.

PATH610 Selected Topics in Pathology
3 Credit Hours
This advanced instructive pathology course employs reading, lecture discussion and demonstration to prepare students to understand the physiologic basis for selected disease conditions. Selected topics include adult acquired cardiovascular disease (HTN, DM, CAD, valves, RF, Marfan's), congenital cardiac and pulmonary defects (CHD, fetal circulation, CDH, MAS, PPHN, HMD), sepsis, pneumonia, ARDS, and coagulopathy. Assessment focuses on the student's ability to evaluate the impact of pathologic conditions on the patient's health and recommend an appropriate extracorporeal application to improve the patient's condition.

Pharmacology

PHRM301 Pharmacology
2 Credit Hours
This course is designed to introduce students to medical pharmacology. Topics include pharmacokinetics, pharmaco-dynamics and fundamental principles of drugs that act on the autonomic and central nervous system. Emphasis is placed on the therapeutic effects, clinical applications, and toxicities of drugs used in the treatment of cardiovascular disorders.

PHRM601 Principles of Pharmacology
0.5 Credit Hour
This advanced instructive pharmacology course employs video, readings, lecture and discussion to develop the students understanding of the fundamental principles in pharmacology. Emphasis is placed on the student's ability to describe fundamental principles in pharmacology and apply them in the context of patients supported with extracorporeal circulation technologies.

PHRM610 Selected Topics in Pharmacology
3 Credit Hours
This advanced instructive pharmacology course employs video, readings, lecture and discussion to develop the students understanding of pharmacologic considerations related to patients supported with extracorporeal circulation technologies. Selected topics include antihypertensive, diuretics, general anesthetics, analgesics, vasopressors, inotropes, antiarrhythmics, anticoagulants, platelet inhibition, acid base, glycemic agents, insulin, steroids and antibiotics.

INTD400 Racism, Medical Violence, and Health Inequality in the U.S.
3 Credit Hours
This course provides a critical examination of race and racism while exploring its structural impact and relationship to health inequality in the U.S. This course will use relevant historical texts, empirical data, and underlying social issues to help offer an in-depth analysis of ongoing medical violence and existing disparities in health care, while paying particular attention to the consequences of anti-Black racism that targets Black bodies, and persists in the U.S. Power, privilege, access, and equity will be prominent themes while students gain a better understanding of how race intersects with health, and as they work towards interventions for more equitable health care practices and public health conditions.

General Education Requirements

Middle States Commission on Higher Education (Upstate's regional accrediting organization). They also satisfy the General Education requirements of the State University of New York (SUNY).

On the basis of their upper-division status and relevant accreditation requirements, the Office of the SUNY Provost has partially waived the SUNY General Education requirements for undergraduate programs at Upstate Medical University. This waiver was granted based on the fact that all bachelor's degree programs are upper division and students enter with prerequisites of 60 credits, having met most of the knowledge and skill areas required by SUNY General Education. The remaining General Education requirements will be completed through

their program of study at Upstate. The requirement for mathematics is met as a prerequisite requirement in the College of Health Professions, or by taking statistics in the College of Nursing. Other course requirements in the programs fulfill the Gen Ed distribution requirements as follows: Professional Communications, Professional and Technical Writing (basic communication), health care ethics and Research Methods (critical thinking) and demonstrating competence in the use of electronic health records and informatics systems (information management).

Center for Bioethics and Humanities

CBHX315 - Health Care Ethics
2 Credit Hours
This course applies ethical theories and principles to contemporary health care dilemmas. Students learn how ethical principles, such as autonomy, confidentiality, truth-telling, justice, beneficence, nonmaleficence, and informed consent, can be used to resolve particular ethical issues and specific cases, i.e. end of life, the allocation of health care, privacy, reproductive rights, testing and screening, biomedical research, and professional conduct. The course emphasizes critical thinking, case-based analysis, ethical decision-making and problem solving.

CBHX316 - Health Care Ethics, Literature, and Film
1 Credit Hour
The course uses literature and film to explore healthcare ethics issues and dilemmas. By analyzing and interpreting literature, fictional and documentary films, and other cultural and artistic work, students will develop analytical and interpretive skills and gain insights into patients' and communities' perspectives on health and healthcare. Students will apply ethical principles and theories to the social and cultural issues that emerge in the literature and film. Issues such as end of life; justice and health disparities; reproductive rights; genetics, testing and screening; biomedical research; empathy, and moral and professional conduct will be explored. The course develops critical thinking, narrative-based analysis, interpretative skills, professionalism, and empathy.

Applied Behavior Analysis Studies MS Program

CIP Code: 422814

Behavior Analysts are licensed health-care professionals who provide therapeutic services for individuals with autism and related disorders. Service delivery might include conducting assessments of problem behavior or language deficits, developing treatments to reduce problem behavior and increase pro-social behavior, consultation, and caregiver training.

Program of Study

Fall Year 1

Course	Credit Hours
ABAS601 Basic Principle of Learning	3
ABAS602 Ethics in Behavior Analysis	3
ABAS604 Single-case Research Experimentation	3
TOTAL	**9**

Spring Year 1

Course	Credit Hours
ABAS603 Behavior change procedures: Selecting and Implementing Intervention for Autism	3
ABAS621 Behavior Assessment	3
ABAS625 Cultural Diversity in Applied Behavior Analysis	3
ABAS691 Behavior Analysis Capstone/Thesis	3
TOTAL	**12**

Summer Year 1

Course	Credit Hours
ABAS606 Record Keeping in Behavior Analysis	2
ABAS645 Concepts and Principles in Behavior Analysis	3
ABAS626 Personnel Supervision and Management of Behavioral Intervention	3
ABAS641 Practicum in Autism Spectrum Disorder	3
TOTAL	**11**

TOTAL CREDIT HOURS 32

Course Descriptions

ABAS601 Basic Principles of Learning
3 Credit Hours
This is an introductory course that will provide an overview of the basic principles of learning. This course will explore learning from a behavior-analytic perspective, focusing on the key theories and concepts used within the field of behavior analysis. The course will consist of a series of lectures, group discussions, and student presentations. Students will be expected to apply knowledge of basic learning principles to address issues of social significance, with a focus on the application of these principles with individuals affected by autism spectrum disorder (ASD).

ABAS602 Ethics in Behavior Analysis
3 Credit Hours
The content in this course will involve both theoretical ethics and specific practice guidelines related to the lawful practice of behavior analysis. The overarching goals of this course are to ensure that students recognize differences between statutes that impact all aspects of ethical behavior in their eventual employment, understand the extent to which conflicting guidelines impact practice, and develop a strong understanding of relevant New York state law and practice guidelines related to the Behavior Analyst license.

ABAS603 Behavior-change procedures: Selecting and Implementing Interventions for Autism
3 Credit Hours
After establishing an understanding of autism spectrum disorder ASD and related symptoms, this course will cover treatments that are supported in the literature for both the core and associated symptoms of ASD. Additionally, information will be provided regarding non-evidence-based treatments that receive attention in the ASD community, such that students can be aware of the range of information that is available related to ASD services. The course will highlight research related to evidence-based interventions for communication, social interaction and play, adaptive skill development, and behavioral reduction.

ABAS604 Single-case Research Experimentation
3 Credit Hours
This course will focus on the application of single- case research methodology in the areas of education, autism spectrum disorder, and developmental disabilities. Topics covered will include behavioral measurement, data collection, experimental designs, data interpretation, and reporting of results.

ABAS606 Record Keeping in Behavior Analysis
2 Credit Hours
This course will cover: (1) the data that form the basis of a client's records for behavior analysts, (2) responsible storage of that data, (3) the mechanisms that govern record keeping, and (4) confidentiality. Throughout the course there will be an emphasis on laws, rules, and regulations set forth by federal and New York State agencies for the protection of client data. The focus will not only be on the maintenance of these records, but also the meaning of that record in terms of protected health information.

ABAS621 Assessment and Treatment of Child Behavior Disorders
3 Credit Hours
This course covers the processes involved in the assessment of behavior using the techniques of applied behavior analysis. Students learn the components of indirect assessment, direct observation, functional assessment, and functional analysis. Additionally, students learn how to effectively link assessment to treatment to develop appropriate behavior intervention plans for a range of childhood disorders.

ABAS625 Cultural Diversity in Applied Behavior Analysis
3 Credit Hours
This course involves topics related to issues of cultural and ethnic diversity that impact the practice of behavior analysis. A review of ethical principles and perspectives of applied behavior analysis is covered before delving into specific considerations that should be addressed in diverse practice placements. Special consideration for working with diverse learners through a non-biased lens is stressed.

ABAS626 Personnel Supervision and Management of Behavioral Interventions
3 Credit Hours
This course addressed topics related to personnel supervision and management of behavior interventions. Students focus on selecting interventions and the fundamentals of supervisory relationships from the perspective of both the supervisor and the supervisee. Additional content addresses factors that occasion an ideal supervisory relationship. The course also examines methods to assess supervisee behavior and plan effective interventions. Assessing the overall structure of supervision to improve behavior and skill acquisition is addressed. A focus on problem identification and problem solving skills are reinforced throughout the semester.

ABAS641 Practicum in Autism Spectrum Disorders
3 Credit Hours
This course includes direct work with students and requires the completion of assessments and interventions with a client with ASD. Content focuses on the mastery of skills related to treating core symptoms of ASD (e.g., communication deficits). Procedures will include prompting strategies, discrete-trial instruction, and extinction, among others. A prerequisite on behavioral assessment is necessary for students to understand the link between assessment and treatment. Students will demonstrate mastery of skills in clinical application.

ABAS645 Concepts and Principles in Behavior Analysis
3 Credit Hours
This class will explore conceptual, behavior-analytic approaches to understanding human and animal behavior. The purpose of this class is to introduce students to different ways to think about common behavioral outcomes and to encourage them to evaluate clinical data from various perspectives. The class will focus on discussion of conceptual and theoretical issues in behavior analysis and conversation about how those issues directly relate to behavior in the real world.

ABAS691 Behavior Analysis Thesis Proposal
3 Credit Hours
Prerequisites: ABAS601, 602 and 604
This course involves a creative research effort that should advance the student's knowledge, skills, and understanding in both the implementation of applied behavior analytic interventions and in appropriate scientific research methodology. By engaging in this process, students develop and establish an area of expertise within the discipline of applied behavior analysis. This course focuses on the design and presentation of a research thesis based on a unique, empirical study relevant to the application of applied behavior analysis. The course includes a written product consisting of a literature review, a method section, hypothetical results, and a discussion.

Clinical Perfusion: Masters of Science Degree Program

CIP Code: 51.0906
http://www.upstate.edu/chp/programs/cp/index.php

Perfusionists are operating room specialists who conduct cardiopulmonary bypass. That is, they pump and oxygenate the blood of patients whose hearts or lungs are stopped, usually during open heart surgery. Occasionally, perfusionists work outside the operating room, providing support for patients with circulatory failure. Working in conjunction with cardiac surgeons, or intensive care providers, perfusionists:

- adjust oxygen levels, change body temperatures, correct electrolyte imbalances and manipulate blood flow to meet each patient's metabolic need
- administer medications, blood products and fluids
- monitor the coagulation status of a patient's blood to prevent clotting
- processing the patients' own blood, and minimize the amount of blood lost during surgery, which minimizes the need for donated blood.

Program of Study for Clinical Perfusion

Fall Year 1	**Credit Hours**
CVPR621 Cardiovascular Perfusion Techniques I	2
CVPR602 Physiological Assessment	2
BIOL610 Selected Topics in Medical Physiology	4
BIOL601 Research Methods	2
CVPR601 Professional Behaviors and Policy in Clinical Perfusion	2
CVPR625 Clinical Applications in Perfusion I	3
CVPR631 Clinical Simulation I: Fundamental Skills	4
PHRM601 Principles of Pharmacology	0.5
TOTAL	**19.5**

Spring Year 1	**Credit Hours**
CVPR622 Cardiovascular Perfusion Techniques II	2
PHRM610 Selected Topics in Pharmacology	3
PATH610 Selected Topics in Pathology	3
BIOL602 Blood and Coagulation	1
BIOL603 Introduction to Immunology	1
CVPR640 Perfusion Research Proposal	1
CVPR626 Clinical Applications in Perfusion II	4
CVPR632 Clinical Simulation II: Case Management	4
TOTAL	**19**

Summer Year 1	**Credit Hours**
CVPR611 Extracorporeal Mechanical Circulatory Support	2
CVPR603 Perfusion Safety	2
CVPR627 Clinical Applications in Perfusion III	2
CVPR641 Clinical Perfusion I+	1 - 7 variable
CVPR633 Clinical Simulation III: ECMO	2
CVPR634 Clinical Simulation IV: Crisis Management	2
CVPR690 Capstone Experience* OR	1 - 10 variable
CVPR680 Research in Cardiovascular Perfusion*	1 - 10 variable
TOTAL	**Minimum of 18**

Fall Year 2	**Credit Hours**
CVPR641 Clinical Perfusion I+	1– 7 variable
CVPR643 Clinical Perfusion IIA+	7
CVPR644 Clinical Perfusion IIB+	7
CVPR690 Capstone Experience* OR	1 -10 variable
CVPR680 Research in Cardiovascular Perfusion*	1 - 10 variable
TOTAL	**Minimum of 15**

Spring Year 2	**Credit Hours**
CVPR643 Clinical Perfusion IIA+	7
CVPR644 Clinical Perfusion IIB+	7
CVPR645 Clinical Perfusion III	7
CVPR690 Capstone Project Presentation*	1 - 10 variable
CVPR680 Research in Cardiovascular Perfusion*	1 - 10 variable
TOTAL	**Minimum of 15**

* Either of these courses may be taken to fulfill the 10 credit-hour Selected Elective
+ These courses can be taken either semester they are offered.

TOTAL CREDIT HOURS	**86.5**

Course Descriptions

CVPR601 Professional Behaviors and Policy in Clinical Perfusion
2 Credit Hours

This introductory instructive course employs reading, lecture, and discussion to prepare students to perceive and appreciate the professional responsibilities and culture of clinical perfusion within a health care system. Examples of national policies and codes of conduct are presented and discussed within the context of the perfusionist's relationship and obligation to their patient, their profession and the industry that supports their field.
Assessment focuses on the student's ability to thoughtfully evaluate and defend models of professional behavior as challenged through situational vignettes.

CVPR602 Physiologic Assessment
2 Credit Hours

This introductory instructive course employs reading, lecture, discussion, and demonstration to develop the student's understanding of physiologic monitoring. Emphasis is placed on cardiovascular hemodynamics and pressure monitoring systems and acid-base homeostasis and blood gas assessment for the critical care patient. Assessment focuses on the student's ability to describe and troubleshoot the proper application of the monitoring systems, differentiate between normal and abnormal parameters, predict the implications of each and recommend measures that will remedy abnormal conditions.

CVPR603 Perfusion Safety
2 Credit Hours

This advanced instructive course employs reading, lecture, discussion, and case studies to prepare students to understand and apply the Cumulative Act Effect (Swiss Cheese Model) of accident causation. The taxonomy and classification of errors, failure domains, and active vs latent failures are presented and discussed

within the context of the care of patients supported with extracorporeal circulation technologies. Assessment focuses on the student's ability to analyze case studies of accidents, summarize the error producing events and design a system which will reduce the risk of failure.

CVPR611 Extracorporeal Mechanical Circulatory Support
2 Credit Hours
This course employs readings, lecture, discussion and demonstration to prepare students to understand and apply extracorporeal technologies to the long- term support of critically ill patients. The design, application and management of ECMO for long term pulmonary support, cardiac support, and VAD is covered in detail. Assessment focuses on the student's ability to distinguish the best extracorporeal application for a patient's pathologic condition, design an appropriate extracorporeal system to support the patient, analyze and troubleshoot the performance of the extracorporeal support and patients.

CVPR621 Cardiovascular Perfusion Techniques I
2 Credit Hours
This introductory instructive course employs reading, lecture, discussion, and demonstration to prepare students to apply fundamental principles and basic technologies to cardiopulmonary bypass applications. Emphasis is placed on the design, function, and application of extracorporeal materials and components (tubing, oxygenators, reservoirs filters, pumps, cannulas, etc.). Assessment focuses on the student's ability to perform preoperative calculations and component selection, explain component design characteristics, evaluate circuit configuration and explain their proper application.

CVPR622 Cardiovascular Perfusion Techniques II
2 Credit Hours
This advanced instructive course employs reading, lecture, discussion, and demonstration to prepare student to apply principles and techniques to the practice of extracorporeal circulation. Topics include hemostasis testing, autologous blood preservation, homologous blood component transfusion, hemoconcentration, circuit miniaturization hypothermia, selective perfusion techniques and special patient populations. Assessment focuses on the student's ability to analyze and interpret physiologic and technical data and recommend techniques and technologies which will improve the patient's care.

CVPR625 Clinical Applications in Perfusion I
3 Credit Hours
This introductory delegated applications course employs case-based learning to help the students integrate and assimilate the concepts and principles presented in this semester's instructive coursework through group projects, presentations and discussion based on case studies of patients supported with extracorporeal circulation technologies. Assessment focuses on the student's ability to combine principles and concepts from across the curriculum into discussions of clinical scenarios and recommend appropriate actions.

CVPR626 Clinical Applications in Perfusion II
4 Credit Hours
This advanced delegated applications course is a continuation of CVPR625 Clinical Applications in Perfusion I and employs case-based learning to help the students integrate and assimilate the concepts and principles presented in the second semester's instructive coursework through group projects, presentations, and discussions based on case studies of patients supported with extracorporeal circulation technologies. Assessment focuses on the student's ability to combine principles and concepts from across the curriculum.

CVPR627 Clinical Applications in Perfusion III
2 Credit Hours
This advanced delegated applications course is a continuation of CVPR626 Clinical Applications II and employs problem-based learning to help the students integrate and assimilate the concepts and principles presented in this semester's instructive coursework through group projects, presentations, and discussion based on case studies of patients supported with extracorporeal circulation technologies. Assessment focuses on the student's ability to combine principles and concepts from across the curriculum into discussions of clinical scenarios and recommend appropriate actions.

CVPR631 Clinical Simulation I: Fundamental Skills
4 Credit Hours
This course employs medical simulation to develop the student's knowledge, critical thinking, clinical skills, and professional communication. Students begin to develop competence with the fundamental skills necessary for the safe conduct of cardiopulmonary bypass in the operating room through repetitive mentored practice. Assessment focuses on the student's ability to perform psychomotor tasks, analyze technical and physiologic data and recommend and conduct appropriate actions.

CVPR632 Clinical Simulation II: Case Management
4 Credit Hours
This advanced course employs medical simulation to develop the student's knowledge, critical thinking, clinical skills and professional communication. Students continue to develop competence through repetitive practice during full mission high fidelity simulation of CABG, Valve, DHCA and combined procedures. The assessment rubrics applied during the prerequisite course are expanded in this course to include ancillary perfusion skills, knowledge of the surgical procedures, and anticipation and conduct of perfusionist's interventions appropriately sequenced with the simulated surgical case.

CVPR633 Clinical Simulation III: ECMO
2 Credit Hours
This advanced course employs medical simulation to develop the student's knowledge, critical thinking, clinical skills and professional communication. Students begin to develop competence with the fundamental and crisis management skills of (ECMO) through repetitive practice during simulated standard and crisis situations. Assessment focuses on the student's ability to perform psychomotor tasks, analyze technical and physiologic data and recommend and conduct appropriate actions and demonstrate knowledge of the patient's anticipated clinical course, and anticipation and conduct of perfusionist's intervention.

CVPR634 Clinical Simulation IV: Crisis Management
2 Credit Hours
This advanced course employs medical simulation to develop the student's knowledge, critical thinking, clinical skills and professional communication. Students continue to develop competence with the fundamental skills of cardiopulmonary bypass through repetitive mentored practice during simulated crisis situations and under realistic error producing conditions. Assessment focuses on the student's ability to perform psychomotor tasks, analyze technical and

physiologic data and recommend and demonstrate leadership while conducting appropriate crisis management and crew resource management actions.

CVPR640 Perfusion Research Proposal
1 Credit Hour
This advanced delegated applications course applies the concepts practiced in BIOL 601 Research Methods to the preparation of a proposal for either a research thesis or a capstone experience. Students will complete a proposal and any applications for institutional clearance (IRB, IACUC etc.) necessary for the completion of the proposed project. Research proposals must earn the support of a faculty mentor. Capstone proposals must conform to the department's menu of currently supported capstone experiences. Assessment is conducted by an advisory committee in accordance with the department's academic policies.

CVPR641 Clinical Perfusion I+
1-7 Variable Credit Hours
This introductory clinical preceptorship course is conducted at affiliate institutions. Students are imbedded within clinical perfusion departments and supervised, mentored and assessed by clinical perfusion instructors. Emphasis is placed on the growth and development of the student's knowledge, critical thinking, clinical skills and professional communication while practicing all aspects of the clinical perfusion scope of practice during patient care events. Students must consistently perform at or above the level of ADVANCED BEGINNER to successfully complete this course.

CVPR643 Clinical Perfusion II A+
7 Credit Hours
This intermediate clinical preceptorship course is conducted at affiliate institutions. Students are embedded within clinical perfusion departments and supervised, mentored and assessed by clinical perfusion instructors. Emphasis is placed on the growth and development of the student's knowledge, critical thinking, clinical skills and professional communication while practicing all aspects of the clinical perfusion scope of practice during patient care events. Students must consistently perform at or above the level of COMPETENT to successfully complete this course.

CVPR644 Clinical Perfusion II B+
7 Credit Hours
This intermediate clinical preceptorship course is conducted at affiliate institutions. Students are embedded within clinical perfusion departments and supervised, mentored and assessed by clinical perfusion instructors. Emphasis is placed on the growth and development of the student's knowledge, critical thinking, clinical skills and professional communication while practicing all aspects of the clinical perfusion scope of practice during patient care events. Students must consistently perform at or above the level of COMPETENT to successfully complete this course.

CVPR645 Clinical Perfusion III
7 Credit Hours
This advanced clinical preceptorship course is conducted at affiliate institutions. Students are embedded within clinical perfusion departments and supervised, mentored, and assessed by clinical perfusion instructors. Emphasis is placed on the growth and development of the student's knowledge, critical thinking, clinical skills, and professional communication while practicing all aspects of the clinical perfusion scope of practice during patient care events. Students must consistently perform at or above the level of PROFICIENT to successfully complete this course.

CVPR680 Research in Cardiovascular Perfusion
1-10 Variable Credit Hours
Original research in cardiovascular perfusion towards the fulfillment of a master's thesis performed with the mentorship of a faculty member. Assessment is conducted by an advisory committee in accordance with the department's academic policy.

CVPR690 Capstone Experience
1-10 Variable Credit Hours
This advanced clinical preceptorship course is conducted at affiliate institutions. Students are imbedded within clinical perfusion departments and directly supervised, mentored and assessed by certified clinical perfusion Instructors. Emphasis is placed on the growth and development of the student's knowledge, critical thinking, clinical skills and professional communication to develop excellence with a professional specialty as approved by the student's advisor and the clinical site. This experience will be the subject of the students Capstone project which includes a written report and oral presentation in accordance with the departments academic policy.

Clinical Laboratory Science - Medical Biotechnology and Medical Technology: Bachelor of Science Degree Programs

CIP Code: 26.1201
http://www.upstate.edu/chp/programs/mb/index.php

Graduates specializing in medical biotechnology work with a team to conduct medical research in academic or industrial settings. In university laboratories, these individuals assist scientists by performing experiments that are part of a medical research study. In industrial laboratories, biotechnologists help develop and manufacture pharmaceutical drugs or vaccines.
Both types of laboratories are involved in research designed to treat or prevent human diseases such as heart disease, cancer, AIDS, genetic diseases, and many others.

Graduates of this program are eligible to sit for the national certifying examination in molecular biology (MB) given by the Board of Certification of the American Society for Clinical Pathology (ASCP).

CIP Code: 51.1005
http://www.upstate.edu/chp/programs/mt/index.php

Medical Technologists (also known as clinical/medical laboratory scientists) develop, perform and supervise laboratory testing that is used to diagnose and treat disease and to provide vital data for research studies. After graduation, many medical technologists work in hospital or physicians' office laboratories conducting a wide range of laboratory measurements—from simple blood tests to complex analyses for cancer, AIDS, viruses, bone marrow abnormalities, therapeutic drug monitoring, infectious disease and molecular diagnoses. Graduates are also prepared for careers that research and develop products used to prevent and treat human disease. They also work in academic settings with medical scientists performing

experiments as part of research studies, or in industrial laboratories producing vaccines and other drugs.

Graduates of this program are eligible to apply for New York State licensure as a Clinical Laboratory Technologist. Graduates are eligible to sit for the national certifying examination given by the Board of Certification of the American Society for Clinical Pathology (ASCP).

While degrees in medical biotechnology or medical technology provide immediate career opportunities after graduation, they are also a good foundation for advanced degrees in medicine or science, or for a career in other medically related fields, such as physician's assistant.

Programs of Study for Medical Biotechnology (MEDB)-BS and Medical Technology (MEDT)-BS

Programs of study take two years (five semesters).
Prerequisite: 60 semester hours in selected subjects

Junior Year

Fall Semester	Credit Hours	MEDB	MEDT
CHEM355 Biochemistry	4	√	√
PATH360 Pathology	3	√	√
MEDT350 Human Genetics	3	√	√
MEDT351 Hematology	4	√	√
MEDT308 Seminar in Biotechnology	1	√	-
MEDT309 Seminar in Medical Technology	1	-	√
BIOL451 Research Methods	1	√	
TOTAL		**16**	**15**

Spring Semester	Credit Hours	MEDB	MEDT
MEDT303 Immunology	3.5	√	√
ENGL325 Professional and Technical Writing	3	√	√
CBHX315 Health Care Ethics	2	√	√
MEDT360 Chemistry	5	√	√
BIOL379 Cell and Molecular Biology	3	√	-
MEDT424 Medical Mycology/Parasitology	2	-	√
TOTAL		**16.5**	**15.5**

Summer Semester	Credit Hours	MEDB	MEDT
MEDT422 Medical Microbiology	6	√	√
MEDT443 Immunohematology	3.5	-	√
TOTAL		**6.0**	**9.5**

Senior Year (MEDB only)

Fall Semester	Credit Hours
MEDT439 Applied Techniques in Medical Biotech	2
MEDT454 Introduction to Molecular Methods	2
MEDT522 Advanced Microbiology and Immunology	1
MEDT445 Statistics in Laboratory Medicine	1.5
MEDT460 Biotechnology Internship I	8
TOTAL	**14.5**

Spring Semester	Credit Hours
MEDT419 Research Problem	3
MEDT455 Laboratory Operations	2
MEDT444 Principles of Molecular Biology	1
MEDT461 Biotechnology Internship II	9
BIOL 414 Intro to Molecular Bioinformatics	2
TOTAL	**17**

Total MEDB SUNY Upstate Medical University Program Credits: 70

Senior Year (MEDT only)

Fall and Spring Semesters	Credit Hours
BIOL451 Research Methods I (F)	1
MEDT401 Clinical Practice Preparation (F)	1
MEDT454 Introduction to Molecular Methods (F)	2
MEDT441 Clinical Correlations I (F)	1
MEDT445 Statistics in Laboratory Medicine (F)	1.5
MEDT453 Capstone Project (S)	1.5
MEDT455 Laboratory Management (S)	2
MEDT442 Clinical Correlations II (S)	1
MEDT436 Clinical Blood Banking (F/S)	5
MEDT427 Clinical Chemistry (F/S)	5
MEDT429 Clinical Microbiology(F/S)	5
MEDT425 Clinical Hematology (F/S)	5
TOTAL	**31.0**

Total MEDT SUNY Upstate Medical University Program Credits: 71

Course Descriptions

MEDT303 Immunology
3.5 Credit Hour
Immunology is the study of the immune system and its responses to infectious organisms and other foreign materials. This course presents basic concepts of humoral (i.e. antibody-mediated) and cell mediated immunity, and mechanisms of immunopathogenesis in specific diseases of the immune system. Basic principles of immunochemical and cellular assays are discussed in lecture and applied in exercises performed in the student laboratory.

MEDT308 Seminar in Biotechnology
1 Credit Hour
This course provides an introduction to the role of the baccalaureate level scientist in biotechnology. Course topics include career opportunities in biotechnology, certification routes, principles of quality control and quality assurance, manufacturing practices followed by industrial laboratories, regulatory issues, biosafety, laboratory notebook keeping, and ethical and professional standards.

MEDT309 Seminar in Medical Technology
1 Credit Hour
This course presents an introduction to the medical technologist/clinical laboratory scientist role in health care. Course topics include ethical issues in health care, certification, patient's rights, community health, resource allocation, as well as the role of the medical technologist/clinical laboratory scientist in research, education, and patient care.

MEDT350 Human Genetics
3 Credit Hours
Introduces students to the genetic concepts and technologies. Basic principles of genetics are presented and applied to the field of laboratory medicine and its role in patient diagnosis.
Information related to Mendelian genetics, mitosis and meiosis, DNA, genes and chromosomes, transcription and translation, and mutations serve as a basic foundation for clinical applications of genetics including cytogenetics, molecular diagnostics, inherited human disorders, genetics of cancer, reproductive technologies, and prenatal diagnosis and genetic counseling.

MEDT351 Hematology
4 Credit Hours
This course consists of lecture and laboratory sessions on the development, morphology, and function of the formed elements of the blood and other body fluids (white blood cells, red blood cells and platelets) and their role in disease processes. Instruction also includes study of the interaction of platelets, coagulation and fibrinolytic factors used in the management of bleeding and thrombotic disorders.

MEDT360 Chemistry
5 Credit Hours
Fundamental aspects of clinical chemistry related to the medical laboratory are presented in this course. Integrated lectures and laboratory sessions focus on pathophysiology of disease and standard practice of clinical laboratory testing in chemistry, including routine urinalysis examination. Emphasis is placed on diagnostic interpretation of biomarker tests and the instrumentation methods used to measure them in blood and other body fluids.

MEDT401 Clinical Practice Preparation
1 Credit Hour
This course provides an overview and introduction to the clinical internship/rotation including but not limited to internship expectations, professional behavior and communication, dress code, expectations and competency requirements. The course is also designed to prepare an individual to perform venipuncture and capillary puncture in order to obtain blood specimens for diagnostic procedures and understand the pre- and post-analytical variables that may affect laboratory test results. Laboratory safety, compliance and regulatory issues affecting the clinical laboratory will be reviewed.

MEDT419 Research Problem
3 Credit Hours
Provides experience in completion of an investigation in a selected research topic. The student learns to use research methods under supervision and presents the results in a seminar and written report.

MEDT422 Medical Microbiology
6 Credit Hours
Course content includes integrated lectures and laboratory sessions designed to study bacteria, viruses, and other related organisms which can be pathogenic for humans. Topics include mechanisms of infection, disease states, clinical presentations, and the effect on the human host. Specimen collection and handling, isolation techniques, organism identification, clinical relevance, culture interpretation, susceptibility testing, as well as other methods used in the detection of agents responsible for infection are also covered.

MEDT424 Medical Mycology/Parasitology
2 Credit Hours
The course offers lecture and laboratory experience in medical mycology and parasitology. The mycology portion of the course will cover topics to include the identifying characteristics and pathophysiology of the medically important fungi. The parasitology portion of the course will include topics on parasite life cycles, host-parasite interactions, pathophysiology of parasitic infections and criteria for the identification of protozoa, flagellates, nematodes, cestodes, and trematodes.

MEDT425 Clinical Hematology
5 Credit Hours
Students perform the procedures to detect the hematologic disorders dealing with the cellular and coagulation elements of the blood. Course topics include routine blood cell counting and coagulation techniques, instrumentation and quality control, as well as specialized tests used to detect anemias and coagulation disorders. Special emphasis is placed on proficiency of differential counting of peripheral blood smears.

MEDT427 Clinical Chemistry
5 Credit Hours
This course involves performing qualitative and quantitative analyses of body fluids such as blood, urine, and spinal fluid. Quality control, which is an essential component of the clinical laboratory, is emphasized together with preventive maintenance of testing equipment. Students learn both operation and application of instrumentation in a clinical chemistry laboratory. Appropriate measures to identify pre- analytical variables affecting sample integrity are taught to students to ensure quality reporting of test results.

MEDT429 Clinical Microbiology
5 Credit Hours
Course content includes clinical instruction and experience in the various areas of microbiology including specimen processing, culturing, culture evaluation and subsequent identification and susceptibility testing of isolates in routine bacteriology, in addition to the specialized diagnostic techniques of mycobacteriology, mycology, parasitology, and virology. Content includes correlation with causes of infectious diseases and current laboratory techniques and practices used to detect and identify causes of infectious diseases.

MEDT436 Clinical Blood Banking
5 Credit Hours
Students in this course will achieve proficiency in routine ABO and Rh typing and initial antibody identification techniques. Students will develop competence in the performance of reagent quality control, antibody detection, crossmatching, problem solving techniques for the resolution of common ABO typing discrepancies and final antibody identification, antibody elution, and cell phenotyping. The student will also be introduced to the practical aspects of component therapy and quality assurance in Blood Banking including blood utilization and review and blood bank information management systems.

MEDT439 Applied Techniques in Medical Biotechnology
2 Credit Hours
This course focuses on clinical and research applications of advanced laboratory techniques through lectures, discussion, and small group or individual laboratory experiences and assumes prior knowledge of principles of human heredity and basic molecular techniques. Topics include applications of molecular techniques in the diagnosis of genetic diseases, infections, and malignancies and collection/preparation of blood samples for testing.

MEDT441 Clinical Correlations I
1 Credit Hour
This course is comprised of a variety of case problems that allow students to draw upon foundational knowledge and concepts established in the pre-clinical courses and applied in the clinical rotation setting. The course teaches students to analyze and integrate content from across the different clinical laboratory disciplines as well as laboratory operations and management. Through reiterative application of problem- solving in a student-centered learning environment, this course will develop the students' skills in critical reasoning and decision making, effective oral communication, efficient utilization of learning resources, and collaborative teamwork.

MEDT442 Clinical Correlations II
1 Credit Hour
This course is comprised of a variety of case problems that allow students to draw upon foundational knowledge and concepts established in the pre-clinical courses and applied in the clinical rotation setting. The course teaches students to analyze and integrate content from across the different clinical laboratory disciplines as well as laboratory operations and management. Through reiterative application of problem solving in a student-centered learning environment, this course will develop the students' skills in critical reasoning and decision making, effective oral communication, efficient utilization of learning resources, and collaborative teamwork.

MEDT443 Immunohematology
3.5 Credit Hours
The study of the immunologic characteristics of blood cell antigens and antibodies including the concepts of in vitro hemagglutination test systems and physiologic mechanisms of hemolysis. Major content areas discussed include the blood group systems, blood component preparation, transfusion therapy, and the adverse effects of transfusion. Discussion of the principles and techniques of pretransfusion compatibility testing including antibody identification will be covered in lecture and practiced in laboratory exercises.

MEDT444 Principles of Molecular Biology
1 Credit Hour
The course is designed to prepare students for the American Society of Clinical Pathology national certification exam in Molecular Biology. Online learning modules cover concepts of molecular science, principles of molecular techniques, clinical applications of molecular testing, and laboratory operations necessary for genetic testing.

MEDT445 Statistics in Laboratory Medicine
1.5 Credit Hours
Foundational aspects of statistical methods utilized in clinical and research laboratory settings is the focus of this course. Descriptive analysis will be applied to validation experiments of analytical test methods, setting test reference intervals, and determining diagnostic efficiency calculations used in medical decision making, including the impact of biological variation on test result interpretation and method performance. Advanced concepts of quality control practices will be integrated into the course. Research study design and inferential hypothesis testing are used to address key concepts related to evidence-based laboratory medicine; use of statistical software is integrated within the course for data analysis.

MEDT453 Capstone Project
1.5 Credit Hours
This course provides experience in the development of a publication-ready case study or research paper. The student learns to use research methods to complete a literature search and to apply this information in the development of a case study or to more fully investigate a selected research topic. The student will present the case study or research topic as a seminar.

MEDT454 Introduction to Molecular Methods
2 Credit Hours
In this course, students will develop an understanding of the basic principles of laboratory methods in molecular biology. The course will emphasize hands-on experience with a variety of molecular techniques used in clinical laboratory science.

MEDT455 Laboratory Management
2 Credit Hours
This course introduces the student to the operating principles and practices of the clinical laboratory. Course topics include the following as related to the pre-analytical, and post-analytical phases of laboratory testing: management principles and processes, regulatory resources, human resources, fiscal resources, quality management, and medical economics.

MEDT460 Biotechnology Internship I
8 Credit Hours
This course will provide students with the opportunity to participate in a supervised learning experience that integrates previous academic course work with practical application in a biotechnology laboratory setting. This experience will allow students to acquire knowledge and develop advanced technical skills that are employed in biotechnology.

MEDT461 Biotechnology Internship II
9 Credit Hours
This course will provide students with an opportunity to participate in a supervised learning experience that integrates previous academic course work with practical applications in a biotechnology laboratory setting. The experience can take place in the same laboratory setting experienced by the student in MEDT 460 Biotechnology Internship I, or in a different laboratory setting. This experience will allow students to acquire additional knowledge and continue to develop advanced technical skills in biotechnology.

MEDT522 Advanced Microbiology and Immunology
1 Credit Hour
This course will cover current topics in the fields of microbiology and immunology. Each topic will be introduced initially by a lecture presentation, which will be followed by a discussion of current publications on the topic. This course will allow students to develop an appreciation of recent advances in the biology of the immune system and how these relate to defense against infectious disease. The course will also allow students to gain an understanding of the pathological mechanisms of microorganisms and how those mechanisms evolve.

Clinical Laboratory Science - Medical Technology Master of Science Degree Programs

CIP Code: 51.1005
http://www.upstate.edu/chp/programs/mt/index.php

The Master of Science in Medical Technology consists of a minimum of 24 credit hours of didactic course work with an additional (minimum) of 6 credit hours of thesis work based upon the student's original research. The thesis project will be under the direction of a faculty member. The course of study the student follows is tailored to the needs of the student as best as possible.

Program of Study for Medical Technology, MS

Core Course Requirements

All Medical Technology M.S. students are required to complete the following:

	Credit Hours
BIOC501 Biochemistry	4
MT624 Thesis Proposal	2
MT700 Thesis	4

Students complete the remainder of their coursework based on their chosen area of concentration.

Hematology

Please note: The program is currently not accepting applications for the Hematology concentration.

Clinical Microbiology

Please note: The program is currently not accepting applications for the Clinical Microbiology concentration.

MedPrep and MedScholars

SUNY Upstate Medical University's MedPrep and MedScholars MS in Medical Technology Programs offers the opportunity to earn a Master's Degree in Medical Technology in preparation for medical education. These rigorous one-year programs give students the opportunity to strengthen and cultivate their academic, and analytical skills.

Courses Required:

Fall Semester	**Credit Hours**
BIOC501 Biochemistry	4
MEDT624 Thesis Proposal	2
BIOL610 Selected Topics in Medical Physiology	4
MEDT539 Applied Techniques in Medical Biotechnology	2
MEDT611 Methods in Clinical Laboratory Medicine	2
MEDT522 Advanced Microbiology and Immunology	1
PHRM601 Principles of Pharmacology	0.5
	15.5
Spring Semester	
BIOC502 Cell and Molecular Biology	3
BIOL501 Human Genetics	3
MEDT501 Laboratory Management	2
PHRM610 Selected Topics in Pharmacology	3
MT700 Thesis	4
	15.0
TOTAL CREDIT HOURS	**30.5**

Course Descriptions

Master of Science

MEDT501 Laboratory Management
2 Credit Hours
The course examines the principles and practices of clinical laboratory management. The course will review the basic concepts of management as it applies in the administrative aspects of a clinical laboratory. Topics in the course include leadership and decisions making, the roles and functions of management, communication skills, conflict management, the ability to manage change, diversity, equity and inclusion, and healthcare ethics. Additional topics include laboratory finances, allocation of resources, strategic planning, and personnel management.

MEDT502 Medical Microbiology
6 Credit Hours
Prerequisite: 1 year of Biology or permission of instructor
Through integrated lectures and laboratory sessions medically important bacterial pathogens are discussed in terms of the clinical, therapeutic, and epidemiological aspects of diseases caused by them, molecular mechanisms of pathogenesis and their identification in the clinical laboratory. Specimen collection and handling, isolation techniques, organism identification, clinical relevance, culture interpretation, susceptibility testing, as well as other methods used in the detection of agents responsible for infection are also covered.

MEDT503 Clinical Microbiology I
5 Credit Hours
Prerequisite: MEDT422 or MEDT502
Course content includes clinical instruction and experience in the various areas of microbiology including specimen processing, culturing, culture evaluation and subsequent identification and susceptibility testing of isolates in routine bacteriology, in addition to the specialized diagnostic techniques of mycobacteriology, mycology, parasitology, and virology. Content includes correlation with causes of infectious diseases and current laboratory techniques and practices used to detect and identify causes of infectious diseases.

MEDT504 Clinical Microbiology II
5 Credit Hours
The various areas of clinical microbiology including advanced techniques and laboratory testing used in the diagnosis and evaluation of infectious diseases, laboratory management, regulatory requirements, personnel evaluation, and interdepartmental collaboration. Evaluation of new testing methodologies and clinical rotational experiences in infectious disease and infection control will also be included. Lectures and individualized instruction are provided to correlate principles of clinical microbiology with the current laboratory techniques and practices used to detect and identify causes of infectious diseases.

MEDT506 Microbiology and Immunology
4 Credit Hours
This course is designed to give the student insight into the fundamentals of microbiology and immunology with emphasis on its relation to human biology and disease. The course covers the basic properties of microorganisms, microbial physiology and genetics, the principles of microbial pathogenicity, the mode of action of

antibiotic and chemotherapeutic agents at the cellular level, the fundamentals of immunology, and the response of the host to infections. The microorganisms studied in this course include the bacteria, fungi, mycoplasmas, rickettsia, chlamydia, viruses and parasites.

MEDT522 Advanced Microbiology and Immunology
1 Credit Hour
This course will cover current topics in the fields of microbiology and immunology. Each topic will be introduced initially by a lecture presentation, which will be followed by a discussion of current publications on the topic. This course will allow students to develop an appreciation of recent advances in the biology of the immune system and how these relate to defense against infectious disease. The course will also allow students to gain an understanding of the pathological mechanisms of microorganisms and how those mechanisms evolve.

MEDT524 Medical Parasitology and Mycology
2 Credit Hours
The course offers lecture and laboratory experience in medical mycology and parasitology. The mycology portion of the course will cover topics to include the identifying characteristics and pathophysiology of the medically important fungi. The parasitology portion of the course will include topics on parasite life cycles, host-parasite interactions, pathophysiology of parasitic infections and criteria for the identification of protozoa, flagellates, nematodes, cestodes, and trematodes.

MEDT539 Applied Techniques in Medical Biotechnology
2 Credit Hours
This course focuses on clinical and research applications of advanced laboratory techniques through lectures, discussion, and small group or individual laboratory experiences and assumes prior knowledge of principles of human heredity and basic molecular techniques. Topics include applications of molecular techniques in the diagnosis of genetic diseases, infections, and malignancies and collection/preparation of blood samples for testing.

MEDT544 Hematology Conference and Tutorial
1.5 Credit Hours
Graduate students will take part in the Hematology Conference in which topics on different aspects of hematology are presented and discussed. The students will be expected to read papers and study assigned case material relevant to the speaker's subject prior to the conference. Following the conference, the graduate students will meet with the Hematology Faculty (Conference Coordinator) for discussion of questions and issues raised in the conference.

MEDT554 Introduction to Molecular Methods
2 Credit Hours
In this course, students will develop an understanding of the basic principles of laboratory methods in molecular biology. The course will emphasize hands-on experience with a variety of molecular techniques used in clinical laboratory science. Students will also be required to write papers describing the clinical manifestations of two diseases, their underlying genetic basis and molecular pathology, and the molecular techniques used in their diagnosis.

MEDT611 Methods in Clinical Laboratory Medicine
2 Credit Hours
In this course, students will develop an understanding of the techniques and methods used in the modern clinical laboratory. The course consists of lectures covering theoretical aspects of important laboratory assays and provides hands-on experience performing specific assays.

MT615 Research Problem and Practicum in Microbiology
1-5 Credit Hours
Prerequisite: Permission of instructor
Laboratory research experience with research time agreed upon by student and instructor that includes independent research experience covering topics in microbiology. Specific topics determined through consultation between student and appropriate faculty member. Tutorial conferences, discussions, and critiques scheduled as necessary. Grading determined by the instructor and could include, but not required, evaluation of skills learned, data obtained, and laboratory notebook record keeping and a final written report. Fall or Spring.

MEDT624 Thesis Proposal
2 Credit Hours
This course will be the first course to be taken for Master's Thesis credit in medical Technology. Under the supervision of a research advisor, the student will prepare an outline, abstract, and referenced review paper describing the problem to be studied, including the background and goals of the proposed study, significance of the problem, and methodological approach to be used in solving the problem. A grade of pass/satisfactory must be received in this course prior to enrollment in MT700 Thesis.

MEDT626 Clinical Laboratory Statistics
2 Credit Hours
This course is designed to introduce students to analytical method validation and quality assurance of patient test results, as applied to clinical laboratory medicine. Students will learn to design appropriate experiments and interpret data by performing calculations; use of statistical software is integrated within the course. Internal and external quality control analysis will be emphasized. As part of the course, students will develop an individualized quality control plan (IQCP) according to published recommendations. Medical decision making based on clinical laboratory test reference intervals and diagnostic efficiency measures are discussed through use of statistical calculations.

MT628 Clinical Chemistry Conference
1 Credit Hour
Consisting primarily of special topics in Clinical Chemistry. This course is part of the Clinical Pathology Residents conference which is scheduled biweekly. This course is available from September through June each year. Arrange with Chemistry Teaching Supervisor for specific attendance schedule. Each student will make one presentation. Student evaluation consists of a criterion-based review.

MT631 Teaching Practicum in Instrumentation
1 Credit Hour
Allows students to gain experience in course development, lecture presentation, lab preparation and student evaluation. The student prepares a course outline, writes objectives, presents at least six lectures, assists in preparing student labs, writes examinations, and

develops evaluation instruments for the students. Opportunity for self-observation and critique is provided through the use of videotape. The student works with the faculty and assists in MEDT360 Chemistry. Student evaluation consists of written assignments, lecture presentations, and criterion base review.

MT635 Computer Utilization in the Laboratory
1 Credit Hour
Introduces the basic mode of computer operation and the use of computers in the clinical laboratory.

MT640 Seminar in Clinical Microbiology
1 Credit Hour
Specialized topics in specific areas of Clinical Microbiology will be presented and discussed in weekly Clinical Microbiology conferences. Students are expected to read papers relevant to the conference's subject prior to the conference. Students are required to give at least two presentations to successfully complete this course. Course may be repeated once during the alternate semester so that a fall-spring semester sequence is completed.

MT641 Teaching Practicum in Microbiology
1-4 Credit Hours
The course is designed to provide students with experiences that will allow for the development of skills for effective undergraduate teaching. Course activities may include the development and presentation of lectures, leading discussion or review sessions, assisting in laboratory sessions, or development of materials for distance education. Additional activities may include development of written tests, one-on- one evaluations, or evaluation of oral presentations. Specific activities will be determined through consultation between student and faculty member. Grading determined by instructor.

MT642 Teaching Practicum in Immunology
3 Credit Hours
Provides practical experience in the preparation and delivery of undergraduate level instruction. The student is required to deliver four didactic presentations and participate in the preparation and supervision of two laboratory sessions in the undergraduate Medical Technology course, MEDT 303 Immunology. For each didactic session, the student develops instructional objectives, a lesson plan, visual aids, and examination questions. Evaluation is based on the preparation and delivery of each lesson plan, and a written paper covering one aspect of education theory.

MT643 Hematology Journal Club
1 Credit Hour
Graduate students, residents, fellows and faculty will meet every other week during the academic year for the purpose of discussing current articles published in the area of hematology. The graduate student is expected to read the assigned papers prior to the day of presentation and to take part in the discussion of the articles. The student is expected to present and discuss papers in rotation (at least 2 articles during the academic year).

MT645 Hematopathology
2 Credit Hours
This course will provide a basic understanding of hematopathology and related areas. Subjects covered in the course include erythropoiesis and anemias, leukocytic disorders, leukemias, lymphoproliferative disorders myeloproliferative disorders, platelets and platelet disorders, blood coagulation, and transfusion therapy. The lectures, laboratories, and seminars are taken with the second year medical students as part of the medical school pathology course.

MT646 Hematology Bone Marrow Practicum
2 Credit Hours
Provides tutorial instruction in the morphology, cytochemistry, and immunohistochemistry of bone marrow, peripheral blood, and lymph nodes in the diagnosis and understanding of hematologic disease. Includes both microscopic and flow cytometric analysis. The student analyzes and writes reports and interpretations for a minimum of 15 bone marrow cases. Each case is reviewed and discussed in detail with the hematopathology fellow or attending pathology faculty member.

MT647 Special Hematology
1.5 Credit Hours
Provides instruction in the use of laboratory testing in the identification of various hemolytic anemias, and disorders of hemostasis and various coagulations factors. The student works with faculty and staff in the Special Hematology - Coagulation Laboratory studying the theory, performance and interpretation of laboratory testing.

MT648 Teaching Practicum in Hematology
3 Credit Hours
Provides practical experience in the preparation and delivery of undergraduate level instruction. The student is required to prepare a minimum of three lecture units including instructional objectives, lesson plans, visual aids, and examination questions. The student also assists in all laboratory sessions and prepares and supervises in at least two laboratory sessions. Evaluation is based on the preparation and delivery of lectures and laboratory sessions, and a written paper covering one aspect of educational theory.

MT700 Thesis
4 Credit Hours
Independent research under the supervision of a faculty member.

Medical Imaging Sciences: Bachelor of Science and Bachelor of Professional Studies Degree Programs

HEGIS Code: 1225
CIP Code: 51.0911
http://www.upstate.edu/chp/programs/mi/index.php

Medical Imaging Science professionals use a variety of computer/digital technologies to generate images for the diagnosis and treatment of disease. These professionals have a high level of patient contact for which strong interpersonal skills are critical. They work in hospitals, clinics, physicians' offices, and imaging centers. Avenues for career development include leadership roles as supervisors, administrators, educators, and researchers. Our medical imaging sciences program educates students in the use of high-tech equipment and procedures to produce:

- Radiographic images (X-rays)
- Computed Tomography images (CTs)
- Magnetic Resonance Images (MRIs)
- Diagnostic Medical Sonography (Ultrasound) images

Program of Study for Bachelor of Science Programs

This upper division program takes two years (five or six consecutive semesters) with students placed in one of three tracks in the second semester: Radiography (X-ray); Radiography CT, or Radiography MR. (Students who choose to pursue a BS in ultrasound apply directly to that program.) All graduates are eligible to take the national certification exams in their chosen modality.

Radiography Track, B.S.

Junior Year

Fall Semester	**Credit Hours**
IMAG300 Imaging Practicum I	2
IMAG301 Positioning Principles I	2
IMAG302 Positioning Laboratory I	2
IMAG311 Fundamentals of Imaging and Physics	5
RDSC326 Radiologic Science Patient Care	2
IMAG329 Radiographic/Topographic/Sectional Anatomy	2
TOTAL	**15**

Spring Semester	**Credit Hours**
ENGL302 Foundations of Professional Communications I	0.5
CBHX315 Health Care Ethics	2
IMAG303 Imaging Practicum II	6
IMAG304 Positioning Principles II	2
IMAG305 Positioning Laboratory II	2
IMAG313 Evaluating Radiographs I	0.5
IMAG324 Radiation Biology and Protection	1
TOTAL	**14**

Summer Semester	**Credit Hours**
IMAG306 Imaging Practicum III	9.5
IMAG308 Positioning Principles III	1
IMAG314 Evaluating Radiographs II	0.5
IMAG315 Positioning Laboratory III	1
TOTAL	**12**

Senior Year

Fall Semester	**Credit Hours**
BIOL451 Research Methods I	1
IMAG 411 Imaging Pathology	3
IMAG415 Imaging Clerkship I	10
TOTAL	**14**

Spring Semester	**Credit Hours**
IMAG410 Quality Management in Medical Imaging	1.5
ENGL 325 Professional and Technical Writing	3
IMAG412 Management Practices	2
IMAG416 Imaging Clerkship II	7
TOTAL	**13.5**

TOTAL CREDIT HOURS	**68.5**

Computed Tomography (CT) Track, BS

Junior Year

Fall Semester	**Credit Hours**
IMAG300 Imaging Practicum I	2
IMAG301 Positioning Principles I	2
IMAG302 Positioning Laboratory I	2
IMAG311 Fundamentals of Imaging and Physics	5
RDSC326 Radiologic Science Patient Care	2
IMAG329 Radiographic/Topographic/Sectional Anatomy	2
TOTAL	**15**

Spring Semester	Credit Hours
ENGL302 Foundations of Professional Communications I	0.5
CBHX315 Health Care Ethics	2
IMAG303 Imaging Practicum II	6
IMAG304 Positioning Principles II	2
IMAG305 Positioning Laboratory II	2
IMAG313 Evaluating Radiographs II	0.5
IMAG324 Radiation Biology & Protections	1
TOTAL	**14**

Summer Semester	Credit Hours
IMAG306 Imaging Practicum III	9.5
IMAG308 Positioning Principles III	1
IMAG314 Evaluating Radiographs III	0.5
IMAG315 Positioning Laboratory III	1
TOTAL	**12**

Senior Year

Fall Semester	Credit Hours
BIOL451 Research Methods I	1
IMAG 411 Imaging Pathology	3
IMAG 400 Imaging Practicum IV	1.5
IMAG 417 Advanced Imaging Procedures CT-I	4
IMAG 431 Advanced Imaging Practicum CT-I BS	3.5
TOTAL	**13**

Spring Semester	Credit Hours
IMAG401 Imaging Practicum V	4
IMAG410 Quality Management in Medical Imaging	1.5
ENGL 303 Foundations of Professional Communication II	0.5
IMAG418 Advanced Imaging Procedures CT – II	2
IMAG435 Advanced Imaging Practicum CT – II BS	5
TOTAL	**13**

Summer Semester	Credit Hours
IMAG402 Imaging Practicum VI	4
IMAG434 Advanced Imaging Practicum CT – III BS	6
TOTAL	**10**

TOTAL CREDIT HOURS **77**

Magnetic Resonance (MR) Track, BS

Junior Year

Fall Semester	Credit Hours
IMAG300 Imaging Practicum I	2
IMAG301 Positioning Principles I	2
IMAG302 Positioning Laboratory I	2
IMAG311 Fundamentals of Imaging and Physics	5
RDSC326 Radiologic Science Patient Care	2
IMAG329 Radiographic/Topographic/Sectional Anatomy	2
TOTAL	**15**

Spring Semester	Credit Hours
ENGL302 Foundations of Professional Communications I	0.5
CBHX315 Health Care Ethics	2
IMAG303 Imaging Practicum II	6
IMAG304 Positioning Principles II	2
IMAG305 Positioning Laboratory II	2
IMAG313 Evaluating Radiographs II	0.5
IMAG324 Radiation Biology & Protections	1
TOTAL	**14**

Summer Semester	Credit Hours
IMAG306 Imaging Practicum III	9.5
IMAG308 Positioning Principles III	1
IMAG314 Evaluating Radiographs III	0.5
IMAG315 Positioning Laboratory III	1
TOTAL	**12**

Senior Year

Fall Semester	Credit Hours
BIOL451 Research Methods I	1
IMAG 411 Imaging Pathology	3
IMAG400 Imaging Practicum IV	1.5
IMAG451 Advanced Imaging	5
IMAG452 Advanced Imaging Practicum MR – I	3.5
TOTAL	**14**

Spring Semester	Credit Hours
IMAG401 Imaging Practicum V	4
IMAG410 Quality Management in Medical Imaging	1.5
ENGL 303 Foundations of Professional Communication II	0.5
IMAG454 Advanced Imaging Procedures MR – II	2
IMAG458 Advanced Imaging Practicum MR – II BS	5
TOTAL	**13**

Summer Semester	Credit Hours
IMAG402 Imaging Practicum VI	4
IMAG457 Advanced Imaging Practicum MR – III BS	6
TOTAL	**10**

TOTAL CREDIT HOURS **78**

Diagnostic Medical Sonography (Ultrasound), BS

Junior Year

Fall Semester	Credit Hours
BIOL451 Research Methods I	1
BIOL340 Advanced Physiology	3
IMAG327 Topographic/Sectional/Imaging Anatomy for Medical Sonographers	3
IMAG461 Ultrasound Physics & Instrumentation I	2
IMAG472 Abdominal Ultrasound	5
RDSC326 Radiologic Science Patient Care	2
TOTAL	**16**

Spring Semester	Credit Hours
CBHX 315 Health Care Ethics	2
IMAG462 Ultrasound Physics & Instrumentation II	2
IMAG466 Ultrasound Simulation Laboratory	1.5
IMAG475 Obstetrics and Gynecology Ultrasound I	3
IMAG480 Clinical Practicum I	5.5
TOTAL	**14**

Summer Semester	Credit Hours
IMAG476 Obstetrics and Gynecology Ultrasound II	2
IMAG481 Clinical Practicum II	10
TOTAL	**12**

Senior Year

Fall Semester	Credit Hours
ENGL325 Professional and Technical Writing	3
IMAG477 Interventional Ultrasound	1
IMAG478 Ultrasound of Superficial Structures	1
IMAG482 Clinical Practicum III	8
TOTAL	**13**

Spring Semester	Credit Hours
IMAG411 Imaging Pathology	3
IMAG465 Ultrasound Senior Project	1
IMAG483 Clinical Practicum IV	10
TOTAL	**14**

TOTAL CREDIT HOURS	**69**

Program of Study for Bachelor of Professional Studies (BPS)

This upper-division transfer program requires an associate's degree and certification in medical radiography. This is a program for radiography students who wish to pursue specialty education in CT, MRI or Sonography. The CT and MRI programs take three consecutive semesters to complete, while the diagnostic medical sonography program requires five consecutive semesters. All graduates are eligible to take national exams in their field. Students rotate through clinical education settings throughout New York State.

Computed Tomography (CT) Track, BPS

Fall Semester	Credit Hours
BIOL451 Research Methods I	1
ENGL325 Professional and Technical Writing	3
PATH360 Pathology	3
IMAG417 Advanced Imaging Procedures CT – I	4
IMAG430 Advanced Imaging Practicum CT – I BPS	6
IMAG329 Radiographic/Topographic/Sectional Anatomy	2
TOTAL	**19**

Spring Semester	Credit Hours
HUMA420 Ethics and Health Professions (see CON section for course description)	3
IMAG411 Imaging Pathology	3
IMAG412 Management Practices	2
IMAG418 Advanced Imaging Procedures CT – II	2
IMAG432 Advanced Imaging Practicum CT – II BPS	7
TOTAL	**17**

Summer Semester	Credit Hours
IMAG436 Advanced Imaging Practicum CT – III BPS	10
IMAG471 Contemporary Issues in Medical Imaging	2
TOTAL	**12**

TOTAL CREDIT HOURS	**48**

Magnetic Resonance (MR) Track, BPS

Fall Semester	Credit Hours
BIOL451 Research Methods I	1
ENGL325 Professional and Technical Writing	3
PATH360 Pathology	3
IMAG448 Advanced Imaging Practicum I – MR	5
IMAG 451 Advanced Imaging Procedures I – MR	5
IMAG329 Radiographic/Topographic/Sectional Anatomy	2
TOTAL	**19**

Spring Semester	Credit Hours
HUMA420 Health Care Ethics (see CON section for course description)	3
IMAG411 Imaging Pathology	3
IMAG412 Management Practices in Medical Imaging	2
IMAG454 Advanced Imaging Procedures MR – II	2
IMAG455 Advanced Imaging Practicum MR – II BPS	7
TOTAL	**17**

Summer Semester	Credit Hours
IMAG459 Advanced Imaging Practicum MR – III BPS	10
IMAG471 Contemporary Issues in Medical Imaging	2
TOTAL	**12**

TOTAL CREDIT HOURS	**48**

Ultrasound Track, BPS

Junior Year

Fall Semester	Credit Hours
BIOL451 Research Methods I	1
BIOL340 Advanced Physiology	3
IMAG327 Topographic/Sectional/Imaging Anatomy for Medical Sonographers	3
IMAG461 Ultrasound Physics and Instrumentation	2
I IMAG472 Abdominal Ultrasound	5
TOTAL	**14**

Spring Semester	Credit Hours
CBHX 315 Health Care Ethics	2
IMAG462 Ultrasound Physics and Instrumentation II	2
IMAG475 Obstetrics and Gynecology Ultrasound I	3
IMAG480 Clinical Practicum I	7
TOTAL	**14**

Summer Semester	Credit Hours
IMAG476 Obstetrics and Gynecology Ultrasound II	2
IMAG481 Clinical Practicum II	10
TOTAL	**12**

Senior Year

Fall Semester	Credit Hours
ENGL325 Professional and Technical Writing	3
IMAG477 Interventional Ultrasound	1
IMAG478 Ultrasound of Superficial Structures	1
IMAG482 Clinical Practicum III	8
TOTAL	**13**

Spring Semester	Credit Hours
IMAG411 Imaging Pathology	3
IMAG465 Ultrasound Senior Project	1
IMAG483 Clinical Practicum IV	10
TOTAL	**14**
TOTAL CREDIT HOURS	**67**

Course Descriptions

IMAG300 Imaging Practicum I
2 Credit Hours

IMAG303 Imaging Practicum II
6 Credit Hours

IMAG306 Imaging Practicum III
9.5 Credit Hours

IMAG400 Imaging Practicum IV
1.5 Credit Hours

IMAG401 Imaging Practicum V
2 Credit Hours

IMAG402 Imaging Practicum VI
4 Credit Hours

Clinical experiences structured into a sequence of progressively increasing levels of applied technical and patient care knowledge and skills. Student experiences will involve performing routine, trauma, portable, and surgical radiographic and fluoroscopic examinations. These experiences will develop student learning from observation through mastery levels.

IMAG301 Positioning Principles I
2 Credit Hours
Instruction of anatomy, radiographic positioning/procedures and equipment manipulation for radiographic examinations of the upper extremity, shoulder girdle, chest, abdomen, lower extremity, hip, pelvis, upper and lower gastrointestinal tract, gall bladder and biliary ducts, genitourinary system, lumbar spine. Through classroom participation and projection charting, students will identify anatomy and describe associated radiographic projections. They will establish interrelationships between the various projections and associated positions and will formulate radiographic principles for each radiographic exam.

IMAG302 Positioning Lab I
2 Credit Hours
Laboratory instruction of radiographic positioning, equipment manipulation, patient care and visual assessment of radiographs for radiographic examinations of the upper extremity, shoulder girdle, chest, abdomen, lower extremity, hip, pelvis, gall bladder and biliary tract, genitourinary tract, lumbosacral spine. Students will assume a technologist's role and perform all aspects of radiographic examinations on classmates under the guidance of the instructor.

IMAG304 Positioning Principles II
2 Credit Hours
Instruction of anatomy, radiographic positioning/procedures and equipment manipulation for radiographic examinations of the thoracic spine, cervical spine, sacrum, coccyx, bony thorax, cranium, facial bones, as well as myelography and arthrography procedures. Through classroom participation and projection charting, students will identify anatomy and describe associated radiographic projections. They will establish interrelationships between the various projections and associated positions and will formulate radiographic principles for each radiographic exam.

IMAG305 Positioning Lab II
2 Credit Hours
Laboratory instruction of radiographic positioning, equipment manipulation, utilization of image receptors, film processing and darkroom procedures, patient care, and visual assessment of radiographs for radiographic examinations of the thoracic spine, cervical spine, sacrum, coccyx, bony thorax, lymph system, cranium, facial bones, myelography, and arthrography. Students will assume a technologist's role and perform all aspects of radiographic examinations on classmates under the guidance of the instructor.

IMAG308 Positioning Principles III
1 Credit Hour
Instruction of positioning, procedures and equipment manipulation for pediatric, geriatric, trauma and "specialized" orthopedic radiographic examinations. Heart catheterization, operating room, emergency room, angiographic and mobile radiography procedures will also be studied. Students will summarize and demonstrate procedures.

IMAG311 Fundamentals of Imaging and Physics
5 Credit Hours
This course will provide students with the knowledge of equipment routinely utilized to produce diagnostic images. Various recording media and techniques will be discussed.
Specific topics to be introduced are fluoroscopy, tomography, mammography, mobile radiography, and cardiovascular imaging. Emphasis on quality will be incorporated into each area of discussion to include its rational, use, and continued process improvement. Methods for proper evaluation of radiographs will be introduced and reinforced with practical application.

IMAG313 Evaluating Radiographs I
0.5 Credit Hour
This course will provide instruction on the evaluation of radiographic image quality with an emphasis on patient positioning, equipment orientation, and tube-part-IR alignment. Evaluation criteria will be presented for the following radiographic examinations: abdomen, chest, upper extremities, shoulder, and lower extremities.

IMAG314 Evaluating Radiographs II
0.5 Credit Hour
This course will provide instruction on the evaluation of radiographic image quality with an emphasis on patient positioning, equipment orientation, and tube-part-IR alignment. Evaluation criteria will be presented for the following radiographic/fluoroscopic examinations: hip, pelvis, upper GI and lower GI tracts, GU system, cranium, vertebral column and bony thorax.

IMAG315 Positioning Laboratory III
1 Credit Hour
Laboratory instruction of radiographic positioning, equipment manipulation, utilization of image receptors, film processing and darkroom procedures, patient care, and visual assessment of radiographs for radiographic examinations of the skull/temporal bones, sinuses, facial bones to include orbits, mandible and TMJ's, pediatric, geriatric, trauma and "specialized" orthopedic radiographic examinations as well as arthrography, myelography and mammography. Students will assume a technologist's role and simulate all aspects of radiographic examinations on classmates under the guidance of the instructor.

IMAG324 Medical Imaging Biology and Protection
1 Credit Hour
The course content presents basic concepts and principles in radiation biology, radiation protection and safety philosophy and practice in the radiologic science environment, radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies and health care organizations are incorporated. Specific responsibilities of the radiologic science professional are discussed and examined. The interactions of radiation with cells, tissues and the body as a whole and resultant biophysical events will also be presented and applied to the clinical practice of medical imaging and radiation therapy.

IMAG327 Topographic/Sectional/Imaging Anatomy for Medical Sonographers
3 Credit Hours
Topographic, sectional and radiographic anatomy will be studied through the use of cadavers, pro-sections, and body slices as well as radiographic, ultrasound, CT, and MRI images. Sonograms presented will demonstrate various anatomic structures in multiple orthogonal planes. The course will consist of presentations and laboratory demonstrations/study.

IMAG329 Radiographic/Topographic/Sectional Anatomy
2 Credit Hours
Topographic, sectional and radiographic anatomy will be studied through the use of body slices/ images, as well as diagnostic radiography, CT, MRI, and ultrasound images. The course will consist of presentations and laboratory demonstrations/study.

IMAG400 Imaging Practicum IV
1.5 Credit Hours
Clinical experiences structured into a sequence of progressively increasing levels of applied technical and patient care knowledge and skills. Student experiences will involve performing routine, trauma, portable, and surgical radiographic and fluoroscopic examinations. These experiences will develop student learning from observation through mastery levels.

IMAG401 Imaging Practicum V
4 Credit Hours
Clinical experiences structured into a sequence of progressively increasing levels of applied technical and patient care knowledge and skills. Student experiences will involve performing routine, trauma, portable, and surgical radiographic and fluoroscopic examinations. These experiences will develop student learning from observation through mastery levels.

IMAGE402 Imaging Practicum VI
4 Credit Hours
Clinical experiences structured into a sequence of progressively increasing levels of applied technical and patient care knowledge and skills. Student experiences will involve performing routine, trauma, portable, and surgical radiographic and fluoroscopic examinations. These experiences will develop student learning from observation through mastery skills.

IMAG410 Quality Management in Medical Imaging
1.5 Credit Hours
Protocols for a quality management program incorporating all operations, functions of the medical imaging profession including operational, administrative aspects of quality management in radiography, mammography, and fluoroscopy. The comprehensive nature of a quality management program is presented, discussed within the context of professional standards of care. Relationships of accreditation, certification, licensure and service delivery standards are presented.

IMAG411 Imaging Pathology
3 Credit Hours
This course examines pathologic conditions that are most commonly demonstrated by radiographic CT, MRI, and U/S imaging procedures. Upon completion of the course, students will be able to identify major pathologic conditions and will be able to recognize the more common pathologic conditions that will be encountered in clinical practice. The course consists of PowerPoint presentations of pathologies accompanied by discussion of the related pathophysiology.

IMAG412 Management Practices
2 Credit Hours
This course introduces the student to management practices in medical imaging. Four primary areas focus on personnel, planning managing and finance. The student will be introduced to administrative structure, personnel management and communication styles and customer relations activities. The course will also introduce the practice of technology assessment, identifying future trends, and financing new technology. Finally, the student will become familiar with the specifics of managing an imaging department: total quality management, licensure, accrediting organizations and risk management.

IMAG415 Imaging Clerkship I
10 Credit Hours
In this sequence of clinical experiences, students will expand their knowledge and application of imaging principles in a progression of increasingly complex examinations in routine, portable, fluoroscopy, trauma, surgical, orthopedic and free standing imaging settings. Students will apply and synthesize imaging principles to formulate creative approaches to image attainment for "difficult" patient conditions. Through rotations in free standing imaging centers, students will gain working knowledge of patient scheduling and record/film management.

IMAG416 Imaging Clerkship II
7 Credit Hours
In this sequence of clinical experiences, students will expand their knowledge and application of imaging principles in a progression of increasingly complex examinations in routine, portable, fluoroscopy, trauma, surgical, orthopedic and free standing imaging settings. Students will apply and synthesize imaging principles to formulate

creative approaches to image attainment for "difficult" patient conditions. Through rotations in free standing imaging centers, students will gain working knowledge of patient scheduling and record/film management.

IMAG417 Advanced Imaging Procedures CT I
4 Credit Hours
This course will introduce the students to the basics of computer tomography image formation, equipment, and terminology. Concepts regarding parameters, scanning protocols and the clinical application of computed tomography will be addressed. Anatomy, positioning criteria, pathology, scanning criteria and any modifications from routine procedures related to the brain, abdomen, pelvis and thorax will be presented.

IMAG418 Advanced Imaging Procedures CT II (2 Credit Hours). This course will introduce the students to the advanced principals of computed tomography image formation, equipment and terminology. Concepts regarding imaging parameters, equipment differentiation, advanced scanning methods and the clinical application of these methods will be addressed. Anatomy, positioning criteria, pathology, scanning criteria and any modifications from routine procedures related to the central nervous system, musculoskeletal system, neck and interventional procedures will be presented.

IMAG430 Advanced Imaging Practicum CT – I BPS
6 Credit Hours

IMAG431 Advanced Imaging Practicum CT – I BS
3.5 Credit Hours

IMAG432 Advanced Imaging Practicum CT – II BPS
7 Credit Hours

IMAG434 Imaging Practicum CT – III BS
6 Credit Hours

IMAG435 Advanced Imaging Practicum CT – II BS
5 Credit Hours

IMAGA436 Advanced Imaging Practicum CT – III BPS
10 Credit Hours
The sequence of clinical experiences, increasing in complexity, will allow the student the opportunity to practice skills necessary to obtain high quality CT images, to objectively alter protocols based on patient pathology or physical condition, and to identify image quality problems and make appropriate corrections. Clinical education is conducted at a clinical facility after or in conjunction with didactic instruction. This course presents a progression in clinical experiences from observation through performance and practice to the mastery level.

IMAG 448 Advanced Imaging Practicum MR – I
5 Credit Hours
This sequence of clinical experiences, increasing in complexity, will allow the student the opportunity to practice skills necessary to obtain high quality MR images, to objectively alter protocols based on patient pathology or physical condition, and to identify image quality problems and make appropriate corrections. Clinical education is conducted at a clinical facility after or in conjunction with didactic instruction. This sequence includes a progression in clinical experiences from observation through performance and practice to the mastery level.

IMAG451 Advanced Imaging Procedures MR – 1
5 Credit Hours
This course presents the basic concepts of magnetic resonance imaging including MRI safety, magnetic characteristics of hydrogen atoms within the body, the Larmor equation, effects of external magnetic fields and radio frequency pulses on hydrogen atoms' magnetic fields, pulse sequences, signal acquisition and related factors, variables affecting image formation, MR image tissue differentiation, slice localization using the Larmor equation, system hardware components, resonance and relaxation, image weighting and contrast parameters, spatial localization and data acquisition.

IMAG452 Advanced Imaging Practicum MR – I
3.5 Credit Hours
This sequence of clinical experiences, increasing in complexity, will allow the student the opportunity to practice skills necessary to obtain high quality MR images, to objectively alter protocols based on patient pathology or physical condition, and to identify image quality problems and make appropriate corrections. Clinical education is conducted at a clinical facility after or in conjunction with didactic instruction. This sequence includes a progression in clinical experiences from observation through performance and practice to the mastery level.

IMAG454 Advanced Imaging Procedures MR – II
2 Credit Hours
Topics presented will include pulse sequence parameters and image artifacts, advanced pulse sequences, and advanced applications in MR imaging.

IMAG455 Advanced Imaging Practicum MR – II BPS
(7 Credit Hours)
This sequence of clinical experiences, increasing in complexity, will allow the student the opportunity to practice skills necessary to obtain high quality MR images, to objectively alter protocols based on patient pathology or physical condition, and to identify image quality problems and make appropriate corrections. Clinical education is conducted at a clinical facility after or in conjunction with didactic instruction. This sequence includes a progression in clinical experiences from observation through performance and practice to the mastery level.

IMAG457 Imaging Practicum MR – III BS
6 Credit Hours
This sequence of clinical experiences, increasing in complexity, will allow the student the opportunity to practice skill necessary to obtain high quality MR images, to objectively alter protocols based on patient pathology or physical condition, and to identify image quality problems and make appropriate corrections. Clinical education is conducted at a clinical facility after or in conjunction with didactic instruction. This sequence includes a progression in clinical experiences from observation through performance and practice to the mastery level.

IMAG458 Advanced Imaging Practicum MR – II BS
5 Credit Hours
This sequence of clinical experiences, increasing in complexity, will allow the student the opportunity to practice skills necessary to obtain high quality MR images, to objectively alter protocols based on patient pathology or physical condition, and to identify image quality problems and make appropriate corrections. Clinical education is conducted at a clinical facility after or in conjunction with didactic

instruction. This sequence includes a progression in clinical experiences from observation through performance and practice to the mastery level.

IMAG459 Advanced Imaging Practicum MR – III BPS
10 Credit Hours
This sequence of clinical experiences, increasing in complexity, will allow the student the opportunity to practice skill necessary to obtain high quality MR images, to objectively alter protocols based on patient pathology or physical condition, and to identify image quality problems and make appropriate corrections. Clinical education is conducted at a clinical facility after or in conjunction with didactic instruction. This sequence includes a progression in clinical experiences from observation through performance and practice to the mastery level.

IMAG461 Ultrasound Physics and Instrumentation I
2 Credit Hours
This course will present the principles of ultrasound instruments, modes of operation, operator control options, frequency selection, echogenic properties, scanning motions and planes, as the principles apply to patient scheduling and patient preparation. A one-hour laboratory session included to simulate review of various obstetrical, gynecological, abdominal and regional anatomy (para- anatomy) sonographic images and their presentation.

IMAG462 Ultrasound Physics and Instrumentation II
2 Credit Hours
This course presents an expanded study of ultrasound principles and instrumentation concepts as they relate to interaction of sound and tissue, equipment instrumentation, bioeffects, quality assurance, transducer construction and artifact recognition for application in patient care.

IMAG465 Ultrasound Senior Project
1 Credit Hour
In this course, the student will develop a hypothesis, abstract, outline, literature assessment, and conclusion for an independent senior research project to be completed in consultation with a member of the faculty. The subject matter will pertain to the diagnostic medical sonography profession. The student, with guidance from a faculty member, will utilize readings, texts, journal articles, practicum experience, or content from seminars and lectures to identify and explore selected subject matter. Students will present hypotheses, major findings, and conclusions.

IMAG466 Ultrasound Simulation Laboratory
1.5 Credit Hours
Laboratory instruction of scanning techniques, equipment manipulation, patient care and visual assessment of ultrasound examination of the abdomen. Students will assume a technologist's role and perform all aspects of ultrasound examinations on classmates under the guidance of the instructor.

IMAG471 Contemporary Issues in Medical Imaging
2 Credit Hours
This course addresses issues in medical imaging and their impact upon the profession. A variety of health care topics will be discussed, disseminated and researched. Documentation of the various topics will include video presentations, case studies, journal entries, panel discussions on select topics, and literature review, presentations, and assessment.

IMAG472 Abdominal Ultrasound
5 Credit Hours
This course will serve as both an introduction to ultrasound and instruction regarding various aspects of abdominal sonography. We will discuss ultrasound evaluation of the major organ systems and blood vessels found in the abdominal cavity. We will also cover various miscellaneous ultrasound exams that will not be covered in subsequent courses (pediatric hips, neuro sonography, pyloric stenosis). We will include discussion and demonstration of anatomy, physiology, pathology, and patient care issues related to sonography. There will also be a significant lab portion to the course. This will consist of hands on scanning practice and demonstrations.

IMAG476 Obstetrics and Gynecology Ultrasound II
2 Credit Hours
This course will present the disease processes and physiological alterations that occur within the female reproductive system and fetus. Sonographic image evaluation of various pathophysiologic conditions associated with the female and fetus are reviewed. This course will include medical terminology, pertinent clinical signs, symptoms, and laboratory tests, pertinent legal principles, infection control and universal precaution considerations and communication, examination ergonomics, and legal/ethical issues specific to obstetric and gynecologic ultrasound procedures are discussed, modeled and role-played. Students will prepare and present an OB/GYN case.

IMAG477 Interventional Ultrasound
1 Credit Hour
This course will present various methods regarding interventional techniques for lesion localization, aspiration and biopsy. The management of aseptic and non-aseptic environments is discussed. Laboratory tests are examined and discussed regarding the relevance in patient management. This course will include medical terminology, pertinent clinical signs, symptoms, and laboratory tests, pertinent legal principles, infection control and universal precaution procedures and pertinent patient care procedures. Vascular imaging is introduced with various applications for associated anatomy.

IMAG478 Ultrasound of Superficial Structures
1 Credit Hour
This course will present gross and sectional anatomy of superficial (e.g. thyroid, breast, testes, joints, etc.) regions of anatomy. This course will include medical terminology, pertinent clinical signs, symptoms, and laboratory tests, pertinent legal principles, infection control and universal precaution procedures and pertinent patient care procedures. Sonographic findings for various pathological and physiological conditions associated with superficial structures will be correlated with other medical imaging presentations.

IMAG480 Clinical Practicum I
5.5 Credit Hours
The student will be performing ultrasound exams of the abdomen in the clinical environment. The student will learn how to produce diagnostic sonograms and differentiate normal and abnormal images. Clinical performance is supervised and routinely evaluated. If clinical performance is unsatisfactory or compromises patient safety, immediate termination from the clinical portion of the program may result.

IMAG481 Clinical Practicum II
10 Credit Hours
Scanning of the abdomen, female reproductive tracts, fetus, and superficial anatomy will be accomplished. Introduction to vascular imaging associated with the aforementioned anatomy will occur. The continued production and interpretation of sonograms for each of these areas is expected. Students are expected to perform examinations in an independent and responsible manner consistent with level of experience and program objectives. Clinical performance is supervised and routinely evaluated. If clinical performance is unsatisfactory or compromises patient, immediate termination from the clinical portion of the program may result.

IMAG482 Clinical Practicum III
8 Credit Hours
Extensive scanning experiences in examinations involving abdominal, obstetric and gynecological procedures, superficial, interventional and vascular applications. Students are expected to perform examinations in an independent and responsible manner consistent with their level of experience and program objectives. Continued production and interpretation of sonograms for each of the aforementioned areas is expected. Clinical performance is supervised and routinely evaluated. Unsatisfactory clinical performance that compromises patient safety may result in dismissal from the clinical portion of the program.

IMAG483 Clinical Practicum IV
10 Credit Hours
Sequel to IMAG482: Intense scanning experience for the student in abdominal, obstetric and gynecological, superficial, interventional and vascular applications. Students will perform examinations in an independent and responsible manner consistent with their level of experience and program objectives. Continued production and interpretation of sonograms for each of the previously mentioned is required. Clinical performance is consistently supervised and routinely evaluated. Unsatisfactory clinical performance that compromises patient safety may result in dismissal from the clinical portion of the program.

RDSC326 Radiologic Science Patient Care
2 Credit Hours
This course orients the student to the clinical practice of Radiologic Science. Topics covered will include patient care clinical skills, medical terminology, and communication.

Physician Assistant: Master of Science in Physician Assistant Studies

CIP Code: 51.0912
http://www.upstate.edu/chp/programs/pa/index.php

Physician assistants are highly qualified licensed health care professionals who practice medicine with physician supervision. Physician assistants participate in a demanding academic and clinical curriculum that prepares them for the complexities of their career. Physician assistants are trained to elicit medical histories, perform physical exams, order and interpret diagnostic studies, perform clinical procedures and formulate patient treatment and management plans. Physician assistants practice in all areas of medicine and surgery.

Opportunities exist in primary care offices (pediatrics, family practice and internal medicine), medical sub-specialty offices such as cardiology, gastroenterology and endocrinology, as well as general surgery and surgical sub-specialty practices such as cardiothoracic surgery and orthopedics. Physician assistants work in various settings including inpatient, outpatient, nursing homes, urgent care centers and emergency rooms.

Summer Semester	**Credit Hours**
DPAS605 Human Anatomy	9
DPAS601 Professional Issues I	1
DPAS603 Population Medicine	1
DPAS608 EKG Interpretation	1
TOTAL	**12**

Fall Semester	**Credit Hours**
DPAS611 General Medicine I	5
DPAS621 Human Physiology I	3
DPAS625 Clinical Pharm I	3
DPAS606 Physical Diagnosis	2
DPAS623 Diagnostic Studies for Health Care Providers	2
DPAS604 Interviewing and Documentation	2
TOTAL	**17**

Spring Semester	**Credit Hours**
DPAS612 General Medicine II	5
DPAS615 Behavioral Science	3
DPAS626 Clinical Pharmacology II	3
DPAS616 Research Design and EBM	2
DPAS622 Human Physiology II	3
DPAS607 Advanced Physical Diagnosis	2
TOTAL	**18**

Summer Semester	**Credit Hours**
DPAS631 Pediatrics	2
DPAS602 Professional Issues II	1
DPAS634 Infection Control	1
DPAS670 Master's Clinical Research I	1
DPAS613 General Medicine III	3
DPAS632 Clinical Procedures	2
DPAS627 Clinical Pharmacology III	2
DPAS633 Clinical Decision Making	1
TOTAL	**13**

Fall Semester	**Credit Hours**
DPAS650-653 4 Clinical Rotations	16
DPAS671 Masters Clinical Research II	1
TOTAL	**17**

Spring Semester	**Credit Hours**
16 weeks	
DPAS654-657 4 Clinical Rotations	16
DPAS672 Masters Clinical Research III	1
TOTAL	**17**

Summer Semester	**Credit Hours**
DPAS658-660 3 Clinical Rotations	12
TOTAL	**12**

TOTAL CREDIT HOURS	**106**

Course Descriptions

DPAS601 Professional Issues I
1 Credit Hour
This course, the first course in a two course sequence, introduces students to the many aspects of the physician assistant profession. Students are introduced to the history and evolution of the profession, the scope of practice of physician assistants, requirements to maintain professional certification and licensure, professional issues facing PA's today, the role of physician assistants in the delivery of health care, and patient confidentiality.

DPAS602 Professional Issues II
1 Credit Hour
This course, a continuation of Professional Issues I, introduces students to issues dealing with patient consent, ethics, reimbursement issues, quality assurance, risk management, and legal issues of healthcare as they apply to physician assistants and the delivery of healthcare. Additionally, PA political and legal issues, patient referral and professional liability are introduced and discussed.

DPAS603 Population Medicine
1 Credit Hour
Preventive health counseling is an important role of the physician assistant. In this course, disease prevention and patient education is emphasized. Students also learn about specialized needs of various populations within communities. Additionally, the relevance of epidemiology and public health within community health is also discussed.

DPAS604 Interviewing and Documentation
2 Credit Hours
This course introduces proper interviewing techniques and provides students with a background in obtaining a complete medical history as well as a problem oriented history. The skill and importance of proper chart documentation is also emphasized.

DPAS605 Human Anatomy
9 Credit Hours
This course includes an in-depth review of the human body through lecture and cadaver dissections. Relationships between human development, structure and function are stressed. Applied clinical anatomy is also emphasized.

DPAS606 Physical Diagnosis
2 Credit Hours
This course, the first of a two-course sequence on physical exam, utilizes both lecture and lab. Using a head-to-toe approach, the lecture portion of this course reviews the proper procedure for performing a complete physical exam as well as the associated documentation for this clinical task. The laboratory component allows students the opportunity to develop, practice and perfect their technique.

DPAS607 Advanced Physical Diagnosis
2 Credit Hours
This course, a continuation of Physical Diagnosis, teaches students the art of a detailed problem focused history and physical exam, along with some specialty exams that are commonly performed by physician assistants in clinical practice. The lecture portion of this course provides detailed descriptions of specific exams, while the laboratory portion allows students the opportunity to practice and perfect techniques.

DPAS608 EKG Interpretation
1 Credit Hour
This course reviews the basic principles of electrocardiography, as well as the interpretation of the 12 lead EKG including rate, rhythm, blocks, axis, hypertrophy, injury, and infarction.

DPAS611 General Medicine I
5 Credit Hours
This is the first course of a three-course sequence. This course covers the etiology, pathophysiology, signs, symptoms, differential diagnosis, laboratory and imaging studies, and treatment for a wide variety of diseases, syndromes, and disorders. Systems and topics covered are sequenced Physiology I and Pharmacology I.

DPAS612 General Medicine II
5 Credit Hours
This course is a continuation of General Medicine I. Systems are sequenced with organ systems in Physiology II and drug classes in Pharmacology II.

DPAS613 General Medicine III
3 Credit Hours
This course is a continuation of General Medicine II with emphasis on medical problems in specialized settings and populations. Specialized populations include OB/GYN and Geriatrics, and specialized settings include General Surgery and Emergency Room.

DPAS615 Behavioral Science
3 Credit Hours
This course emphasizes the use of behavioral sciences in understanding human functioning in health and disease. The course is organized into four units: overview, mood disorders, child and adolescent disorders, and somatoform disorders.

DPAS616 Research Design and Evidence Based Medicine
2 Credit Hours
This course introduces students to the basic language, logic, and designs used in clinical research. Principles of evidence-based practice, as related to the clinical practice of medicine, are also introduced. This course prepares students for their capstone Master's Project.

DPAS621 Human Physiology I
3 Credit Hours
This is the first course of a two-course sequence. Using a systems approach, this course reviews the normal functioning of human tissues and organs as well as the pathophysiology of various diseases and illnesses. Organ systems are sequenced with drug classes in Pharmacology I and topics in General Medicine I.

DPAS622 Human Physiology II
3 Credit Hours
This course is a continuation of Physiology I. Systems are sequenced with topics in General Medicine II and drug classes in Pharmacology II.

DPAS623 Diagnostic Studies for Healthcare Providers
2 Credit Hours
This course is designed to teach the clinician the important question of when to order appropriate laboratory and medical imaging studies along with how to interpret these results. This course also reviews cost effectiveness for the purpose of improved patient monitoring and enhanced diagnostic accuracy.

DPAS625 Clinical Pharmacology I
3 Credit Hours
This is the first course of sequence. This course covers general pharmacologic principles, drug receptor sites, physiologic reactions, half-life, therapeutic effects, metabolism, excretion and possible side effects of different classes of drugs on various organ systems. Practical clinical application is emphasized; drug classes are synchronized with organ systems in General Medicine I.

DPAS626 Clinical Pharmacology II
3 Credit Hours
This is the second course of sequence. This course covers general pharmacologic principles, drug receptor sites, physiologic reactions, half-life, therapeutic effects, metabolism, excretion and possible side effects of different classes of drugs on various organ systems. Practical clinical application is emphasized; drug classes are synchronized with organ systems in General Medicine II.

DPAS627 Clinical Pharmacology III
2 Credit Hours
This is the third course of sequence. This course covers general pharmacologic principles, drug receptor sites, physiologic reactions, half-life, therapeutic effects, metabolism, excretion and possible side effects of different classes of drugs on various organ systems. Practical clinical application is emphasized; drug classes are synchronized with organ systems in General Medicine III.

DPAS631 Pediatrics
2 Credit Hours
This course introduces students to the fundamentals of pediatric medicine, covering the neonate through the adolescent, including preventive care and the diagnosis and treatment of common pediatric disorders and illnesses.

DPAS632 Clinical Procedures
2 Credit Hours
This course involves both lecture and lab. The lecture portion reviews indications, contraindications, technique, and complications involving various clinical procedures. The laboratory portion allows students the opportunity to practice and perfect these techniques.

DPAS633 Clinical Decision Making
1 Credit Hour
This case-based course teaches systematic approach to the assessment and therapeutic management of clinical problems. Included in the case discussions are the history and physical exam findings, appropriate use of diagnostic studies, development of differential diagnosis, formulation of treatment plans, and description of disease prognosis.

DPAS634 Infection Control
1 Credit Hour
This online course fulfills the New York State requirements regarding infection control for licensed health care providers. Topics covered include infection control practices and interventions for compliance and safety, chain of infection, personal protective equipment (PPE), reprocessing methods, and prevention of blood borne pathogens and communicable diseases.

DPAS650 Clinical Rotation I
4 Credit Hours

DPAS651 Clinical Rotation II
4 Credit Hours

DPAS652 Clinical Rotation III
4 Credit Hours

DPAS653 Clinical Rotation IV
4 Credit Hours

DPAS654 Clinical Rotation V
4 Credit Hours

DPAS655 Clinical Rotation VI
4 Credit Hours

DPAS656 Clinical Rotation VII
4 Credit Hours

DPAS657 Clinical Rotation VIII
4 Credit Hours

DPAS658 Clinical Rotation IX
4 Credit Hours

DPAS659 Clinical Rotation X
4 Credit Hours

DPAS660 Clinical Rotation XI
4 Credit Hours

During these eleven four-week clinical rotations, students are assigned to a clinically affiliated health care provider. In these settings, students are able to integrate the knowledge and skills learned during the didactic year and practice in a supervised setting under the direction of a licensed health care provider. Students will complete all of the following rotations: Family Medicine, Internal Medicine, Pediatrics, Women's Health, Behavioral Medicine, General Surgery, Emergency Medicine, Long Term Care and electives.

DPAS670 Master's Clinical Research I
1 Credit Hour
This is the first of a three-sequence course in which students begin to devise their final capstone Master's Project. Students work with the course instructor to define and refine a clinical question on a topic of their choice and begin the first draft of their literature review.

DPAS671 Master's Clinical Research II
1 Credit Hour
This is the second of a three-sequence course in which students finalize and submit the written report for their final capstone project.

DPAS672 Master's Clinical Research III
1 Credit Hour
This is the final of a three-course series in which students create a poster on their selected research topic and present their poster to faculty and peers. During this supervised independent study course, students work with their project advisor to assure reasonable progress is occurring in development of their poster.

Physical Therapy: Doctor of Physical Therapy (DPT)

CIP Code: 51.2308
http://www.upstate.edu/chp/programs/pt/index.php

Physical therapists (PTs) work directly with people to enhance movement and promote optimal health and function. PTs manage pain through movement, hands-on care, and patient education. In addition, PTs collaborate with their patients/clients to prevent mobility loss and to develop fitness and wellness programs focused on healthy and active lifestyles.

Physical therapists work with all systems of the body and diagnose and treat patients of all ages. They are employed in clinical settings that include hospitals, rehabilitation centers, private practices, universities, extended care facilities, home settings, and sports medicine centers.

(2024/25) Program of Study for Doctor of Physical Therapy Program Code- Professional DPT: 27835

First Year

Summer	**Credit Hours**
PHYT601 Gross Anatomy	6
PHYT602 Professional Behaviors	3
TOTAL	**9**

Fall	**Credit Hours**
PHYT611 Bioscience I	5
PHYT615 Introduction to Manual Therapy and Exercise	3
PHYT621 Foundations of Patient/Client Management	3
PHYT625 Kinesiology and Examination of the Upper Quarter	4
PHYT642 Foundations of Evidence Based Practice	2
TOTAL	**17**

Spring	**Credit Hours**
PHYT604 Differential Diagnosis in Physical Therapy	3
PHYT605 Neuroscience	6
PHYT612 Bioscience II	2
PHYT616 Physical Agents: Assessment and Intervention	2
PHYT626 Kinesiology and Examination of the Lower Quarter	4
TOTAL	**17**

Second Year

Summer	**Credit Hours**
PHYT631 Patient/Client Management: Adult Neurological Disorders	3
PHYT632 Patient/Client Management: The Spine	2
PHYT644 Physiology of Exercise	2
TOTAL	**7**

Fall	**Credit Hours**
PHYT636 Patient/Client Management: Acquired Conditions	3
PHYT637 Ethics and Social Determinants of Health	1
PHYT641 Teaching and Learning in PT	2
PHYT661 Clinical Experience I	8
TOTAL	**14**

Spring	**Credit Hours**
Elective	1-3
PHYT618 Therapeutic Exercise/Activities	3
PHYT634 Patient/Client Management: Developmental Disabilities	3
PHYT643 Critical Inquiry	1
PHYT646 Patient/Client Management: Orthopedics	3
PHYT647 Psychosocial Aspects of Patient Care	2
PHYT648 Imaging	2
PHYT650 Integumentary Management	1
TOTAL	**16-18**

Third Year

Summer	**Credit Hours**
Elective	0-3
PHYT662 Clinical Experience II	8
TOTAL	**8-11**

Fall	**Credit Hours**
Elective (2)	1-3
PHYT635 Patient/Client Management: Cardiovascular and Pulmonary Disorders	3
PHYT651 Applied Clinical Decision Making	2
PHYT652 Management Principles	2
PHYT654 Geriatrics for Physical Therapists	3
PHYT638 Ethics in Action Through Service	1
TOTAL	**12-14**

Spring	**Credit Hours**
PHYT663 Clinical Experience III	10
PHYT664 Clinical Experience IV	10
TOTAL	**20**

Minimum number of program credits: 121 (includes 3 required credits of electives). Students may take up to a total of 9 credits of electives for a total of 127 credits. Students are required to complete simulated patient examinations at the end of the first two years.

Course Descriptions

PHYT601 Gross Anatomy
6 Credit Hours
This course utilizes a regional approach to the study of human anatomy. Cadaver dissection in the laboratory is supplemented by lectures, clinical correlation presentations, and audiovisual aids.

PHYT602 Professional Behaviors
3 Credit Hours
This course is framed around the core values, generic abilities and development of professional behaviors. The principles and foundational elements necessary for practicing in the professional realm of physical therapy and in the healthcare environment are reviewed. Issues relating to standards of practice, ethical and legal considerations, communication, time and resource management, stress management in relation to health and wellness, professionalism, and interpersonal and professional relationships are covered. Self-reflection and portfolio development are integral to the course.

PHYT604 Differential Diagnosis in Physical Therapy
3 Credit Hours
This course presents theories and concepts of clinical decision making and diagnosis in the context of determining if a patient presents with issues that are within the physical therapist's scope of practice. All aspects of patient management are addressed with regard to a variety of systemic disorders, with emphasis on those that are most pertinent to physical therapy practice. Through lecture, discussion, and case-based exercises, students gain an understanding of the impact of common systemic disorders on patient management. Clinical experiences are integrated into this course.

PHYT605 Neuroscience
6 Credit Hours
This course presents an integrated approach to the general organization and function of the human nervous system and includes an in- depth presentation of human neurophysiology and neuroanatomy. Emphasis is placed on the sensory and motor systems. Pathophysiologic aspects of neurologic conditions across the life span including differential signs and symptoms, typical clinical course, medical prognosis and management, motor control and motor learning principles are integrated with basic neuroscience knowledge.

PHYT611 Bioscience I
5 Credit Hours
Using a systems approach, this course emphasizes the integration of histology, physiology, pathology, and pharmacology as these disciplines apply to the human body across the life span. The relationship between structure and function of healthy body systems is investigated. The impact of common pathologies, and the pharmacological interventions used to treat those pathologies, on physical therapy practice are subsequently analyzed. Units of study include normal and abnormal structure and function of cells and tissue types, neural, endocrine, immune, muscle, circulatory, lymphatic and respiratory systems.

PHYT612 Bioscience II
2 Credit Hours
This course is a continuation of Bioscience l. Using a systems approach, this course emphasizes the integration of histology, physiology, pathology, and pharmacology as these disciplines apply to the human body across the life span. Units of study include the study of normal and abnormal structure and function of skeletal, integumentary, gastrointestinal, and genitourinary systems.

PHYT615 Introduction to Manual Therapy and Exercise
3 Credit Hours
This course introduces the principles of selected interventions, including soft tissue mobilization and manipulation, therapeutic massage, wellness and prevention, physical fitness, and therapeutic exercise.

PHYT616 Physical Agents: Assessment and Intervention
2 Credit Hours
This course reviews the biophysical principles, physiological implications, indications and contraindications underlying various physical agents, electrotherapeutic procedures and devices, and electrophysiological assessments of neuromuscular integrity. Intervention rationale includes the use of evidence-based practice. Students will practice the operation of physical agents in a safe manner to assess and treat various musculoskeletal, neuromuscular, and integumentary disorders.

PHYT618 Therapeutic Exercise/Activities
3 Credit Hours
This course develops clinical skills focused on advanced therapeutic exercise techniques, including aquatic therapy and therapeutic exercise and clinical management for selected patient populations.

PHYT621 Foundations of Patient/Client Management
3 Credit Hours
This course introduces the students to foundational practice models, concepts and mobility skills that serve as a basis for patient management. Professional documentation and use of outcome measures to promote clinical decision making will be introduced and practiced. Patient education and communication skills will be emphasized. Students will participate in an integrated clinical experience in an acute care or rehabilitation center to promote understanding and skill development.

PHYT625 Kinesiology and Examination of the Upper Quarter
4 Credit Hours
This course introduces and integrates basic kinesiological/ biomechanical principles related to the normal function/movement of the cervicothoracic spine and upper quarter with the basic principles of patient/client management of common conditions of the cervical region and upper extremity.

PHYT626 Kinesiology and Examination of the Lower Quarter
4 Credit Hours
This course integrates kinesiological/biomechanical principles related to the normal function/movement of the lumbopelvic and lower quarter, including posture and gait, with the basic principles of patient/client management of spinal and lower extremity conditions across the life span.

PHYT631 Patient/Client Management: Adult Neurological Disorders
3 Credit Hours
This course focuses on skill development for examination, evaluation and interventions with individuals with neurologic impairments. Content focuses on evidence-based practice for the adult patient with central nervous system dysfunction, such as head trauma, cerebral vascular accident and other common neurologic disorders. A cased-based problem-solving approach is emphasized integrating student's previous knowledge regarding normal functioning of the nervous system.

PHYT632 Patient/Client Management: The Spine
2 Credit Hours
This introductory course focuses on the management of patient/clients with spinal disorders with an emphasis on the biopsychosocial approach. The course consists of the clinical decision making and clinical skill development required for managing patients with spinal disorders. Selected interventions taught include manual therapy, patient education, and therapeutic exercise.

PHYT634 Patient/Client Management: Developmental Disabilities
3 Credit Hours
This course examines the developmental concerns and issues encountered in pediatric clinical practice, in examination, evaluation, physical therapy intervention and coordination, communication and documentation for the pediatric patient are included. This course includes discussions of normal development, various pediatric diagnoses, family centered care, legislative issues guiding pediatric physical therapy practice and coordination of physical therapy service with the pediatric team.

PHYT635 Patient/Client Management: Cardiovascular and Pulmonary Disorders
3 Credit Hours
This course focuses on the management of patient/clients with cardiopulmonary disorders with an emphasis on the normal structure and function of the cardiopulmonary system and the pathophysiology of the disorder of the respiratory system, heart, and circulatory system. Physical therapy examination and treatment of the patient/client with cardiopulmonary dysfunction is the focus for clinical skill development.

PHYT636 Patient/Client Management: Acquired Conditions
3 Credit Hours
This course integrates three units: 1) examination, evaluation, interventions, and clinical decision making for individuals needing orthotics; 2) examination, evaluation, interventions and clinical decision making for individuals with spinal cord injury and 3) examinations, evaluation, intervention and clinical decision making for individuals needing prosthetics.

PHYT637 Ethics and the Social Determinants of Health
1 Credit Hour
This course acquaints students with the interrelationship of ethical principles and social determinants of health as they pertain to physical therapy and introduces a model for ethical decision-making that integrates moral, legal and ethical principles in clinical practice. Cases that illustrate ethical issues and social determinants of health are discussed in ways that broaden perspectives on healthcare and develop an appreciation for moral, legal, cultural, political and economic factors that influence patients and systems within the health care community.

PHYT638 Ethics in Action Through Service
1 Credit Hour
This service-learning course provides students with the opportunity to work in community organizations that address health inequities. A minimum of 30 hours of service at select community sites will be coordinated through the Center for Civic Engagement. Monthly didactic learning sessions will be offered in coordination with PRVM423 Service Learning and Community Health, promoting interprofessional dialogue around shared service experiences.

PHYT641 Teaching and Learning in Physical Therapy
2 Credit Hours
This course emphasizes the knowledge, skills and behaviors needed by the physical therapist to educate patients/clients, caregivers, families, professional colleagues, students and community members. Content includes application of teaching and learning theories, lesson plan development, didactic and clinical teaching techniques, methods of instruction and evaluation, and an introduction to the use of technology in education. A requirement of this course is to participate in a videotaped microteach session.

PHYT642 Foundations of Evidence Based Practice
2 Credit Hours
This course acquaints the student with the basic language, logic and methods of quantitative, qualitative and epidemiologic research as they apply to the health sciences. Principles of research are introduced through lecture, readings, in class discussions, and assignments. Students are also introduced to the statistical methods most commonly employed in health research. Students will be trained to search scientific evidence through online databases and library research and learn to use citation management software for references. Critical appraisal of scientific articles regarding study design, statistical methods, result interpretation, and clinical implication is introduced through lecture and in-class activities.

PHYT643 Critical Inquiry
1 Credit Hour
The purpose of this seminar is to apply the broad concepts of research methods, as presented in the Research Methods course, and the concepts learned in Foundations of Evidence-based Practice to specific clinical problems. The student will read, critically analyze, and summarize evidence found in physical therapy and related literature to complete a written review of literature and poster. The students will give oral presentations of the literature review.

PHYT644 Physiology of Exercise
2 Credit Hours
Acute and chronic physiological responses to aerobic exercise are examined. Principles of submaximal and maximal aerobic cardiorespiratory fitness are emphasized. Guidelines for developing a comprehensive exercise prescription, wellness and health promotion and community exercise across the lifespan are discussed. Introduction to nutrition and exercise prescription for special populations is introduced through case study.

PHYT646 Patient/Client Management: Orthopedics
3 Credit Hours
This course encompasses medical and physical therapy intervention for a variety of orthopedic disorders utilizing cases and current evidence to build upon previous orthopedic courses. Additional special topics are also introduced.

PHYT647 Psychosocial Aspects of Patient Care
2 Credit Hours
This course provides an opportunity to analyze and synthesize the psychological and sociological aspects of patient/client care. The emphasis is on self-directed learning and self-knowledge.

PHYT648 Imaging
2 Credit Hours
This course provides an opportunity to review normal radiologic images as well as discuss findings for common patient / client conditions, injuries, or diagnoses. Indications for commonly used diagnostic imaging modalities are included. The applications of imaging in both clinical practice and biomedical research are discussed.

PHYT650 Integumentary Management
1 Credit Hour
This course introduces the students to foundational concepts, examinations, tests, measures and interventions that serve as a framework for patient/client management of persons with integumentary concerns. The course will focus on wounds that are the result of venous insufficiency, arterial insufficiency, pressure, neuropathy, surgery, lymphedema and burns. Case studies, lab experiences, and patient observations are utilized to develop skills in these areas.

PHYT651 Applied Clinical Decision Making
2 Credit Hours
In this capstone course, students integrate the process of examination, evaluation, physical therapy diagnosis, prognosis, and interventions of selected conditions seen in physical therapy. A case-based, structured learning format employing the principles of evidence-based practice is used.

PHYT652 Management Principles
2 Credit Hours
This course allows the student to explore multiple aspects of the administrative process as it relates to the practice of physical therapy. An administrative project is an integral part of the course.

PHYT654 Geriatrics for Physical Therapists
3 Credit Hours
This course provides an in-depth examination of aging as it relates to physical therapy. Concepts and principles of aging are examined in light of evidence-based practice, including the biological, psychological, social and cultural aspects of aging. Care is given to differentiate between normal biological age changes and those due to other factors such as physical inactivity, emotional responses, and disease processes.

PHYT661 Clinical Experience I
8 Credit Hours
This is the first of four full-time clinical education experiences that integrates academic course work with patient/client care. Experiences may take place at an in- or out-patient setting in a wide geographic distribution. Under the supervision of clinical faculty, students begin to develop knowledge, skills, and behavior in professional practice, patient management and practice management as defined in the Clinical Performance Instrument (CPI).

PHYT662 Clinical Experience II
8 Credit Hours
This is the second of four full time clinical education experiences that integrate academic course work with patient/client care. Experiences may take place at an in- or out-patient setting in a wide geographic distribution. Under the supervision of clinical faculty, students begin to develop knowledge, skills, and behaviors in professional practice, patient management and practice management. Course objectives reflect heightened expectations consistent with an intermediate clinical experience.

PHYT663 Clinical Experience III
10 Credit Hours
This is the third of four full time clinical education experiences that integrates academic course work with patient/client care. Experiences may take place at an in- or out-patient setting in a wide geographic distribution. Under the supervision of clinical faculty, students continue to develop knowledge, skills, and behaviors in professional practice, patient management, and practice management with movement towards, or achievement of, entry-level performance as defined by the Clinical Performance Instrument (CPI).

PHYT664 Clinical Experience IV
10 Credit Hours
This is the fourth and final full-time clinical education experience that integrates academic coursework with patient/client care. Experiences may take place at an in- or out-patient setting in a wide geographic distribution. At the conclusion of this experience, students consistently demonstrate entry-level performance in professional practice, patient management and practice management as defined by the Clinical Performance Instrument (CPI).

DPT Electives:

Enrollment is limited and subject to instructor and faculty advisor approval.

PHYT622 Current Issues in Pediatric PT
1 Credit Hour
This elective encompasses all phases of pediatric intervention: from conception of an appropriate plan of care given the clientele, to implementation, to assessment of program effectiveness, to documentation of program results. Combination of supervised treatment sessions and selected advanced pediatric topics.

PHYT623 Current Issues in Orthopedic PT
1 Credit Hour
This elective focuses on concepts and practice for critical thinking and manual therapy. It is an interactive format including active discussion and engaging debate.

PYHT624 Current Issues in Aging
1-3 Credit Hours
This elective looks at current issues in aging utilizing a variety of formats.

PHYT658 Clinical Fellowship
1-2 Credit Hours
Students will work with participants in the *Vitality* Fitness Program at the IHP which is a community exercise program for older adults and those with chronic diseases. Students will develop an individualized exercise program based on goals, past medical history and functional testing. Opportunity to work in the traditional land exercise or aquatic exercise program.

PHYT659 Teaching Practicum
1-2 Credit Hours
Teaching / Lab Assistant
This course is an assignment as a course teaching assistant. Individual courses and number of students vary.

PHYT675 Research Fellowship
1 or 2 Credit Hours
Students participate in various aspects of ongoing faculty projects including conceptualization, review of literature, IRB preparation, data collection, entry, and analysis and/or writing.

PHYT680 001 Current Topics in PT: Pelvic Floor
1 Credit Hour
The course includes pelvic floor anatomy and introduces history, evaluation and treatment techniques for urinary incontinence, pelvic pain, and lumbopelvic and hip conditions. This elective is designed to integrate evidence based pelvic floor rehabilitation with students' current knowledge of orthopedic practice. Limited to third year DPT students.

PHYT680 002 Current Topics in PT: Sports
2 Credit Hours
The course will focus on developing the student's knowledge base pertaining to evaluation and physical therapy management of the athlete. It will focus on criterion based return to play and evidence informed practice. Limited to 3rd year DPT students.

PHYT680 003 Current Topics in PT: Global Service Learning
1 Credit Hour
This elective looks at current issues in healthcare from a global perspective. Areas include pediatrics geriatrics, rural health, and special healthcare topics. Preparation occurs prior to the trip and includes history and safety. There is a student cost for travel, room and board in country.

PHYT699 Independent Study
1-2 Credit Hours
Designed collaboratively with faculty member.

Physical Therapy: Doctor of Physical Therapy (DPT

CIP Code: 51.2308
http://www.upstate.edu/chp/programs/pt/index.php

Physical therapists (PTs) work directly with people to enhance movement and promote optimal health and function. PTs manage pain through movement, hands-on care, and patient education. In addition, PTs collaborate with their patients/clients to prevent mobility loss and to develop fitness and wellness programs focused on healthy and active lifestyles.

Physical therapists work with all systems of the body and diagnose and treat patients of all ages. They are employed in clinical settings that include hospitals, rehabilitation centers, private practices, universities, extended care facilities, home settings, and sports medicine centers.

New Curriculum– Effective Summer 2025

Program of Study for Doctor of Physical Therapy Program Code-Professional DPT: 27835

First Year

Summer (9 weeks)	**Credit Hours**
PHYT601 Gross Anatomy	5
PHYT610 Fundamentals of Physical Therapist Practice 1	4
TOTAL	**9**

Fall (15 weeks)	**Credit Hours**
PHYT606 Clinical Sciences and Differential Diagnosis 1	4
PHYT608 Therapeutic Exercise 1	3
PHYT613 Fundamentals of Physical Therapist Practice 2	4
PHYT625 Musculoskeletal 1	4
TOTAL	**15**

Spring (15 weeks)	**Credit Hours**
PHYT607 Clinical Sciences and Differential Diagnosis 2	4
PHYT605 Clinical Neuroscience	5
PHYT614 Fundamentals of Physical Therapist Practice 3	3
PHYT626 Musculoskeletal 2	4
TOTAL	**16**

Second Year

Summer (14 weeks)	**Credit Hours**
PHYT631 Neuromuscular Disorders 1	3
PHYT609 Therapeutic Exercise 2	2
PHYT632 Spine	2
PHYT661 Clinical Experience 1	8
TOTAL	**15**

Fall (15 weeks)	**Credit Hours**
PHYT 618 Therapeutic Exercise 3	2
PHYT 634 Developmental Disabilities	3
PHYT 643 Critical Inquiry 1	.5
PHYT 646 Orthopedics	4
PHYT 619 Fundamentals of Physical Therapist Practice 4	3
Electives (PHYTXXX)	0-1
TOTAL	**12.5-13.5**

Spring (15 weeks)	**Credit Hours**
PHYT 662 Clinical Experience 2	10
PHYT 636 Neuromuscular Disorders 2	2
PHYT 667 Critical Inquiry 2	.5
PHYT 620 Fundamentals of Physical Therapist Practice 5	2
TOTAL	**14.5**

Third Year

Summer (14 weeks)	**Credit Hours**
PHYT 635 Cardiovascular and Pulmonary Physical Therapy	3
PHYT 652 Management Principles	2
PHYT 654 Geriatrics	3
PHYT 639 Fundamentals of Physical Therapist Practice 6	3
Elective (PHYTXXX)	0-1
TOTAL	**11-12**

Fall (12 weeks)	**Credit Hours**
PHYT 663 Clinical Experience	12
TOTAL	**12**

Minimum number of program credits: 106
(includes 1 required credit of electives).

Students may take up to a total of 9 credits of electives for a total of 127 credits. Students are required to complete simulated patient examinations at the end of the first two years.

Course Descriptions

PHYT601 Gross Anatomy
5 Credit Hours
This course utilizes a regional approach to the study of human anatomy. Cadaver dissection in the laboratory is supplemented by lectures, clinical correlation presentations, and audiovisual aids.

PHYT605 Clinical Neuroscience
5 Credit Hours
This course presents an integrated approach to the general organization and function of the human nervous system and includes an in- depth presentation of human neurophysiology and neuroanatomy. Emphasis is placed on the sensory and motor systems. Pathophysiologic aspects of neurologic conditions across the life span including differential signs and symptoms, typical clinical course, medical prognosis and management, motor control and motor learning principles are integrated with basic neuroscience knowledge.

PHYT606 Clinical Sciences and Differential Diagnosis 1
4 Credit Hours
This course integrates histology, physiology, pathology, pharmacology, and clinical reasoning in relation to the human body across the lifespan. It analyzes the effects of common pathologies and their pharmacological treatments on physical therapy practice. All of these concepts are discussed within the context of determining if a patient's issues fall within the scope of a physical therapist's practice.

PHYT 607 Clinical Sciences and Differential Diagnosis 2
4 Credit Hours
This course is a continuation of PHYT 606 Clinical Sciences and Differential Diagnosis I. It integrates histology, physiology, pathology, pharmacology, and clinical reasoning in relation to the human body across the lifespan. The course analyzes the effects of common pathologies and their pharmacological treatments on physical therapy practice. All of these concepts are discussed within the context of determining if a patient's issues fall within the scope of a physical therapist's practice.

PHYT 608 Therapeutic Exercise 1
3 Credit Hours
This course introduces the concepts of exercise physiology and applies those concepts to exercise prescription.

PHYT 609 Therapeutic Exercise 2
2 Credit Hours
This course applies the concepts of exercise physiology and exercise prescription to select patient populations and physical therapy practice settings.

PHYT610 Fundamentals of Physical Therapist Practice 1
4 Credit Hours
This course introduces foundational skills around communication, examination, clinical decision making, and interventions. Focused content in this course includes professional behaviors, practice models, evidence-based practice, and documentation. A case-based, structured learning format applying the principles of evidence-based practice will be used.

PHYT613 Fundamentals of Physical Therapist Practice 2
4 Credit Hours
This course introduces foundational skills around communication, examination, clinical decision making, and interventions. Focused content in this course includes assistive devices, mobility and access, patient handling, billing, and documentation. A case-based, structured learning format applying the principles of evidence-based practice will be used.

PHYT614 Fundamentals of Physical Therapist Practice 3
3 Credit Hours
In this course, students practice foundational skills around communication, examination, clinical decision making, and interventions. Focused content includes imaging, physical agents, neurological screening, pathological gait, and evidence-based practice. A case-based, structured learning format applying the principles of evidence-based practice will be used.

PHYT618 Therapeutic Exercise 3
2 Credit Hours
This course advances clinical skills in evidence based therapeutic exercise and physical activities for complex patient populations.

PHYT619 Fundamentals of Physical Therapist Practice 4
3 Credit Hours
In this course, students apply foundational skills around communication, examination, clinical decision making, and interventions. Focused content includes principles of teaching and learning, ethics, psychological and sociological aspects of patient/client care, and social determinants of health. A case-based, structured learning format applying the principles of evidence-based practice will be used.

PHYT620 Fundamentals of Physical Therapist Practice 5
2 Credit Hours
In this course, students integrate foundational skills around communication, examination, clinical decision making, and interventions. Focused content includes integumentary system management. A case-based, structured learning format applying the principles of evidence-based practice will be used.

PHYT625 Musculoskeletal 1
4 Credit Hours
This course introduces and integrates basic kinesiological/ biomechanical principles related to the normal function/movement of the cervicothoracic spine and upper quarter with the basic principles of patient/client management of common conditions of the cervical region and upper extremity.

PHYT626 Musculoskeletal 2
4 Credit Hours
This course introduces and integrates basic kinesiological/ biomechanical principles related to the normal function/movement of the lumbar spine and lower quarter with the basic principles of patient/client management of common conditions of the lumbar region and lower extremity.

PHYT631 Neuromuscular Disorders 1
3 Credit Hours
This course focuses on skill development for examination, evaluation, and interventions for adults with neurological impairments. Content focuses on evidence-based practice for central nervous system dysfunctions, such as traumatic brain injury, stroke, multiple sclerosis, Parkinson’s disease, vestibular diagnoses, and other common neurological disorders. A case-based problem-solving approach is emphasized, integrating students' previous knowledge regarding the normal functioning of the nervous system, neurology, and prognosis.

PHYT632 Spine
2 Credit Hours
This introductory course focuses on the management of patient/ clients with spinal disorders with an emphasis on the biopsychosocial approach. The course consists of the clinical decision making and clinical skill development required for managing patients with spinal disorders. Selected interventions taught include manual therapy, patient education, and therapeutic exercise.

PHYT634 Developmental Disabilities
3 Credit Hours
This course includes principles of normal development, and examination, evaluation, and intervention across the lifespan for individuals with developmental disabilities. Content includes family-centered care, special concerns of various age groups, selected medical diagnoses, the impact of public law on the delivery of care, and clients with multiple disabilities.

PHYT635 Cardiovascular and Pulmonary Physical Therapy
3 Credit Hours
This course focuses on the management of patient/clients with cardiopulmonary disorders with an emphasis on the normal structure and function of the cardiopulmonary system and the pathophysiology of the disorders of the respiratory system, heart, and circulatory system. Physical therapy examination and treatment of the patient/client with cardiopulmonary dysfunction is the focus for clinical skill development.

PHYT636 Neuromuscular Disorders 2
2 Credit Hours
This course introduces principles of examination, evaluation, interventions, and clinical decision making for the management of individuals with spinal cord injury and individuals needing amputation surgery and rehabilitation for prosthetic training.

PHYT639 Fundamentals of Physical Therapist Practice 6
3 Credit Hours
In this course, students integrate foundational skills around communication, examination, clinical decision making, and interventions. Focused content includes the management of complex patients. A case-based, structured learning format applying the principles of evidence-based practice will be used.

PHYT643 Critical Inquiry 1
0.5 Credit Hour
In this course, students will identify, read, critically analyze, and summarize the scientific literature related to a specific clinical problem. Students will complete a written review of the literature, develop a poster, and present their findings.

PHYT646 Orthopedics
4 Credit Hours
This advanced course is designed to provide students with a comprehensive understanding of the assessment, treatment, and rehabilitation of a wide range of orthopedic disorders. It equips students with the skills and expertise needed to manage patients with orthopedic disorders.

PHYT652 Management Principles
2 Credit Hours
This course covers practice administration, rules and regulations impacting the physical therapy profession, and risk management for businesses and individual providers. It equips students with the skills and expertise needed to navigate physical therapy practice management.

PHYT654 Geriatrics
3 Credit Hours
This course provides an in-depth examination of aging as it relates to physical therapy. Concepts and principles of aging are examined in light of evidence-based practice, including the biological, psychological, social and cultural aspects of aging. Care is given to differentiate between normal biological age changes and those due to other factors such as physical inactivity, emotional responses, and disease processes.

PHYT661 Clinical Experience I
8 Credit Hours
This is the first of three full-time clinical education experiences that integrates academic coursework with patient/client care. Experiences may take place at an in- or out-patient setting in a wide geographic distribution. Under the supervision of clinical faculty students begin to develop knowledge, skills, and behaviors in all elements of patient/client management.

PHYT662 Clinical Experience II
10 Credit Hours
This is the second of three full-time clinical education experiences that integrates academic coursework with patient/client care. Experiences may take place at an in- or out-patient setting in a wide geographic distribution. Under the supervision of clinical faculty students begin to develop knowledge, skills, and behaviors in all elements of patient/client management.

PHYT663 Clinical Experience III
12 Credit Hours
This is the third of three full-time clinical education experiences that integrates academic coursework with patient/client care. Experiences may take place at an in- or out-patient setting in a wide geographic distribution. Under the supervision of clinical faculty students begin to develop knowledge, skills, and behaviors in all elements of patient/client management.

PHYT667 Critical Inquiry 2
0.5 Credit Hour
In this course, students will identify, read, critically analyze, and summarize the scientific literature related to a specific clinical problem. Students will complete a written review of the literature, develop a poster, and present their findings.

DPT Electives:

Enrollment is limited and subject to instructor and faculty advisor approval.

PHYT622 Current Issues in Pediatric PT
1-3 Credit Hours
This elective encompasses all phases of pediatric intervention: from conception of an appropriate plan of care given the clientele, to implementation, to assessment of program effectiveness, to documentation of program results. Combination of supervised treatment sessions and selected advanced pediatric topics.

PHYT623 Current Issues in Orthopedic PT
1 Credit Hour
This elective focuses on concepts and practice for critical thinking and manual therapy. It is an interactive format including active discussion and engaging debate.

PYHT624 Current Issues in Aging
1-3 Credit Hours
This elective looks at current issues in aging utilizing a variety of formats.

PHYT658 Clinical Fellowship
1-2 Credit Hours
Students will work with participants in the *Vitality* Fitness Program at the IHP which is a community exercise program for older adults and those with chronic diseases. Students will develop an individualized exercise program based on goals, past medical history and functional testing. Opportunity to work in the traditional land exercise or aquatic exercise program.

PHYT659 Teaching Practicum
1-2 Credit Hours
Teaching / Lab Assistant
This course is an assignment as a course teaching assistant. Individual courses and number of students vary.

PHYT675 Research Fellowship
1 or 2 Credit Hours
Students participate in various aspects of ongoing faculty projects including conceptualization, review of literature, IRB preparation, data collection, entry, and analysis and/or writing.

PHYT680 001 Current Topics in PT: Pelvic Floor
1 Credit Hour
The course includes pelvic floor anatomy and introduces history, evaluation and treatment techniques for urinary incontinence, pelvic pain, and lumbopelvic and hip conditions. This elective is designed to integrate evidence based pelvic floor rehabilitation with students' current knowledge of orthopedic practice. Limited to third year DPT students.

PHYT680 002 Current Topics in PT: Sports
2 Credit Hours
The course will focus on developing the student's knowledge base pertaining to evaluation and physical therapy management of the athlete. It will focus on criterion based return to play and evidence informed practice. Limited to 3rd year DPT students.

PHYT680 003 Current Topics in PT: Global Service Learning
1 Credit Hour
This elective looks at current issues in healthcare from a global perspective. Areas include pediatrics geriatrics, rural health, and special healthcare topics. Preparation occurs prior to the trip and includes history and safety. There is a student cost for travel, room and board in country.

PHYT699 Independent Study
1-2 Credit Hours
Designed collaboratively with faculty member.

Radiation Therapy: Bachelor of Science and Bachelor of Professional Studies Degree Programs

CIP Code: 51.0907
http://www.upstate.edu/chp/programs/rt/index.php

A radiation therapist works as a member of a team of oncology professionals who use carefully targeted doses of powerful radiation beams to destroy tumors without permanently damaging the surrounding normal tissues.

Graduates of both programs are eligible to apply to take the American Registry of Radiologic Technologists qualifying examination.

Program of Study for Bachelor of Science Program

This program takes two years (five semesters).
Prerequisite: 3 semester hours in selected subjects.

Junior Year

Fall Semester	**Credit Hours**
BIOL451 Research Methods I	1
PATH360 Pathology	3
RADT300 Introduction to Radiation Therapy	1.5
RADT317 Essentials of Oncology I	4
RADT323 Radiologic Physics and Imaging	3
RADT 327 Applied Radiation Oncology Anatomy	1
RDSC326 Radiologic Science Patient Care	2
TOTAL	**15.5**

Spring Semester	**Credit Hours**
ENGL302 Foundations of Professional Communications I	0.5
RADT318 Essentials of Oncology II	2
RADT320 Introduction to Clinical Education	1
RADT342 Advanced Radiation Oncology Imaging	2
RADT324 Radiation Biology and Protection	1
RADT361 Dosimetry	6
CBHX315 Health Care Ethics	2
TOTAL	**14.5**

Summer Semester	**Credit Hours**
RADT321 Treatment Application I	4
RADT331 Clinical Simulation I	4
RADT422 Treatment Application II	4
TOTAL	**12**

Senior Year

Fall Semester	**Credit Hours**
ENGL303 Foundations of Professional Communications II	0.5
RADT423 Treatment Application III	6
RADT432 Clinical Simulation II	6
RADT451 Radiation Therapy Seminar I	2
RADT455 Radiation Oncology Management	0.5
TOTAL	**15**

Spring Semester	**Credit Hours**
RADT365 Radiation Therapy Physics	2
RADT441 Clinical Internship I	6
RADT442 Clinical Internship II	5.5
RADT452 Radiation Therapy Seminar II	2
RADT470 Senior Project	0.5
TOTAL	**16.05**

TOTAL CREDIT HOURS	**73**

RADT442 Clinical Internship II	5
RADT452 Radiation Therapy Seminar II	2
RADT470 Senior Project	0.5
TOTAL	**14.5**

Program of Study for Bachelor of Professional Studies

This program takes two years (five semesters).
Prerequisite: registered or registry-eligible medical radiographers, with at least 53 credits.

Junior Year

Fall Semester	Credit Hours
BIOL451 Research Methods I	1
ENGL325 Professional and Technical Writing	3
PATH360 Pathology	3
RADT300 Introduction to Radiation Therapy	1.5
RADT317 Essentials of Oncology I	4
RADT323 Radiologic Physics and Imaging	3
RADT327 Applied Radiation Oncology Anatomy	1
TOTAL	**16.5**

Spring Semester	Credit Hours
RADT318 Essentials of Oncology II	2
RADT320 Introduction to Clinical Education	1
RADT342 Advanced Radiation Oncology. Imaging	2
CBHX315 Health Care Ethics	2
RADT324 Radiation Biology & Protection	1
RADT463 Dosimetry	6
TOTAL	**14**

Summer Semester	Credit Hours
RADT321 Treatment Application I	4
RADT331 Clinical Simulation I	4
RADT422 Treatment Application II	4
TOTAL	**12**

Senior Year

Fall Semester	Credit Hours
RADT423 Treatment Application III	6
RADT432 Clinical Simulation II	6
RADT451 Radiation Therapy Seminar I	2
RADT455 Radiation Oncology Management	0.5
TOTAL	**14.5**

Spring Semester	Credit Hours
RADT365 Radiation Therapy Physics	2
RADT441 Clinical Internship I	6
RADT442 Clinical Internship II	5.5
RADT452 Radiation Therapy Seminar II	2
RADT470 Senior Project	0.5
TOTAL	**16**

Course Descriptions

RADT300 Introduction to Radiation Therapy
1.5 Credit Hours
Content is designed to provide an introduction to the use of radiation therapy equipment, procedure and technique, patient positioning and immobilization for appropriate tumor localization and treatment delivery. The roles and responsibilities of the radiation therapist, the treatment prescription, the documentation of treatment parameters and delivery, emergency procedures and patient information needs will be presented. The use of electronic media will also be introduced.

RADT317 Essentials of Oncology I
4 Credit Hours
The focus of this course will initially be on primary, secondary and tertiary disease prevention in general with particular reference to cancer prevention, detection, diagnosis, classification and treatment The radiation therapist's responsibility in the management of neoplastic diseases of the skin, respiratory tract, and gastrointestinal tract will be covered including the epidemiology, etiology, detection, diagnosis, treatment and prognosis of tumors occurring at these sites. The course will consist of lecture and discussion.

RADT318 Essentials of Oncology II
2 Credit Hours
This course builds on material presented in RADT 317, continuing to focus on the radiation therapist's responsibility in the management of neoplastic diseases of the head and neck, CNS, musculoskeletal, lymphomas and leukemia, male and female genitourinary, pediatric and includes the epidemiology, etiology, detection, diagnosis, treatment and prognosis of tumors occurring at these sites. The course will consist of lecture and discussion.

RADT320 Introduction to Clinical Education
1 Credit Hour
This course introduces the student to the clinical environment where clinical practice experiences are designed to provide care to the patient in the therapeutic setting for simulation, treatment planning and administration of a prescribed course of treatment. This will be performed in a laboratory setting.

RADT321 Treatment Application I
4 Credit Hours
Sequential clinical practice experiences, increasing in complexity, during which the student provides patient treatments using various teletherapy units. This will be performed in various clinical education settings under the direct supervision of the clinical faculty. Progress is assessed through the evaluation of achievement of clinical competency and is graded via a pass/fail system.

RADT323 Radiologic Physics and Imaging
6 Credit Hours
This course will provide students with the knowledge of equipment utilized to produce medical images. Various recording media and techniques will be discussed. Specific topics to be introduced are atomic structure, electromagnetism, radiation production and interaction, image receptors, patient safety and dose limitation procedures and image archive systems. Emphasis on quality will be incorporated into each area of discussion to include its rationale, use, and continued process improvement. Students will be provided with handouts, PowerPoint presentations and Internet resources.

RADT324 Radiation Biology and Protection
1 Credit Hour
The course content presents basic concepts and principles in radiation biology, radiation protection and safety philosophy and practice in a modern radiation oncology department. The interactions of radiation with cells, tissues and the body, and resulting biophysical events will be presented and applied to the clinical practice of radiation therapy. Radiation health and safety requirements of federal and state regulatory agencies, accreditation agencies and health care organizations are incorporated.

RADT327 Applied Radiation Oncology Anatomy
1 Credit Hour
Topographic, sectional, and radiographic anatomy as it applies to the practice of radiation therapy will be studied through the use cadaver materials, and various diagnostic and therapeutic images.

RADT331 Clinical Simulation I
4 Credit Hours
Sequential clinical practice experiences, increasing in complexity, shall be designed to provide care to the patient in the therapeutic setting for simulation, treatment planning and preparation for administration of a prescribed course of treatment. This will be performed in various clinical education settings under the direct supervision of the clinical faculty. Progress is assessed through the evaluation of achievement of clinical competency and is graded via a pass/fail system.

RADT341 Radiation Oncology Imaging
1 Credit Hour
Content is designed to establish a knowledge base in factors that govern and influence the production and recording of radiographic images for patient simulation, treatment planning and treatment verification in radiation oncology. Radiation oncology imaging equipment and related devices will be emphasized. Laboratory sessions will facilitate student understanding and application of theory.

RADT342 Advanced Radiation Oncology Imaging
2 Credit Hours
Content is designed to establish a knowledge base in factors that govern and influence the production and recording of Computed Tomographic (CT) Magnetic Resonance (MR), Positron Emission Tomography (PET and Ultrasound imaging for patient simulation, treatment planning and treatment verification in radiation oncology.

RADT365 Radiation Therapy Physics
2 Credit Hours
Content is designed, through lecture, discussion and illustrated talk, to provide a detailed analysis of the structure of matter, properties of radiation, nuclear transformations, x-ray production and interactions of ionizing radiation as it applies to treatment units used in external beam radiation therapy, measurement of ionizing radiation produced, absorbed dose measurement, and dose distribution.

RADT422 Treatment Application II
4 Credit Hours
Sequential clinical practice experiences, increasing in complexity, during which the student provides patient treatments using various teletherapy units. This will be performed in various clinical education settings under the direct supervision of the clinical faculty. Progress is assessed through the evaluation of achievement of clinical competency and is graded via a pass/fail system.

RADT423 Treatment Application III
4 Credit Hours
Sequential clinical practice experiences increasing in complexity, during which the student provides patient treatments using various teletherapy units. Will be performed in various clinical education settings under the direct supervision of the clinical faculty. Progress assessed through the evaluation of achievement of clinical competency and is graded via a pass/fail system.

RADT432 Clinical Simulation II
6 Credit Hours
Sequential clinical practice experiences, increasing in complexity, shall be designed to provide care to the patient in the therapeutic setting for simulation, treatment planning and preparation for administration of a prescribed course of treatment. This will be performed in various clinical education settings under the direct supervision of the clinical faculty. Progress is assessed through the evaluation of achievement of clinical competency and is graded via a pass/fail system.

RADT441 Clinical Internship I
6 Credit Hours
During first final spring clinical experience, the student, under the direct supervision of the clinical faculty, will perform all the functions of an entry level radiation therapist in all the clinical areas. These experiences permit the student to refine and develop clinical skills that reflect competencies for entry into practice. All experiences will be performed in clinical education settings, possibly outside of Syracuse. Progress is assessed through the evaluation of achievement of clinical competency and is graded via a pass/fail system.

RADT442 Clinical Internship II
5.5 Credit Hours
During this final clinical experience, the student, under the direct supervision of the clinical faculty, will perform all the functions of an entry level radiation therapist in all the clinical areas. These experiences permit the student to refine and develop clinical skills that reflect competencies for entry into practice. Progress is assessed through the evaluation of achievement of clinical competency and is graded via a pass/fail system.

RADT451 Radiation Therapy Seminar I
2 Credit Hours
The major focus of the senior seminar courses is on the practice of radiation therapy from a case-based point of view. Building on the basic knowledge of oncology and physics acquired in the junior year, the management of oncologic cases is explored in depth along with social, and psychological factors that impact on the treatment plan and delivery. Review of the current professional literature is also expected.

RADT452 Radiation Therapy Seminar II
2 Credit Hours
The major focus of the senior seminar courses is on the practice of radiation therapy from a case-based point of view. Building on the basic knowledge of oncology and physics acquired in the junior year, the management of oncologic cases is explored in depth along with social, and psychological factors that impact on the treatment plan and delivery. Review of the current professional literature is also expected.

RADT455 Radiation Oncology Management
0.5 Credit Hour
This course provides opportunities for the student to gain a practical understanding of organizational behavior issues, reimbursement methodologies and payment systems, and marketing. Current issues will be examined from a management perspective. Additionally, the student will enhance the skills necessary to look for and retain employment.

RADT463 Medical Dosimetry
6 Credit Hours
This course combines theory, practical skills, and discussions to build a strong foundation in assessing, comparing, contrasting and recommending radiation therapy equipment, techniques, and tumor localization. Topics include treatment prescription, documentation, patient contouring, calculations, and emerging technologies, along with quality management and special procedures.

RADT470 Senior Project
0.5 Credit Hour
This individual instruction course provides the senior level student with an opportunity to explore a radiation therapy subject area of interest selected in consultation with a member of the faculty. It is graded via a pass/fail system.

Respiratory Therapy: Bachelor of Science Degree

CIP Code: 51.0908
http://www.upstate.edu/chp/programs/csrc/index.php

Respiratory Therapy is a health profession which involves evaluation, treatment, monitoring, and education of patients with a wide variety of cardiopulmonary disorders. Their patients may be found in many settings, including newborn, pediatric and adult /intensive care units; emergency departments; general medical units; extended care facilities; the home; disease management programs, research facilities, physician offices; rehabilitation programs; sleep and pulmonary laboratories; ground and air transport; educational facilities; and the medical industry.

Respiratory Therapists are experts in providing specialized therapeutic procedures for patients with life-threatening conditions, using life support devices such as mechanical ventilation, medical gases, medications, and lung clearance therapies. Respiratory therapists also provide rehabilitation, monitoring, education and support for patients with chronic respiratory conditions. Therapists combine state-of-the-art technology ("high tech") with close patient contact ("high touch") and complete competency-based courses such as the Neonatal Resuscitation Program (NRP), Pediatric Advanced Life Support (PALS) and Advanced Cardiovascular Life Support (ACLS). They are skilled in many areas including cardiopulmonary physiology, acute and chronic disease management, aerosolized medication selection and administration, use of many medical gases including oxygen, management of the airway both acutely and chronically, both short term and long term mechanical ventilation, assisting patients with lung expansion and clearance, and many types of tests and monitors to evaluate the cardiopulmonary system.

Respiratory therapists are involved in the management of cardiopulmonary disorders such as respiratory failure, heart failure, asthma, cystic fibrosis, pulmonary edema, emphysema and chronic bronchitis (COPD), drowning, hemorrhage, and shock. Therapists are also educated and competent in patient and peer teaching, community education, health promotion and disease prevention, various forms of research and leadership/management roles in various organizations.

Program of Study: Bachelor of Science in Respiratory Care

The Program of Study for the Bachelor of Science Program is a full-time entry-level program in Respiratory Therapy.

Graduates of this program receive a Bachelor of Science Degree in Respiratory Care and are eligible to sit for national credentialing examinations and to apply for licensure as respiratory therapists throughout the United States.

Junior Year

Fall Semester		**Credit Hours**
RESP307	Disease Management I	1
RESP313	Cardiopulmonary Physiology I	4
RESP316	Teaching and Learning in Respiratory Therapy	2
RESP317	Clinical Application I: Basic Respiratory Care	2
RESP321	Physical Principles of Respiratory Care	2
RESP343	Clinical Lab I	3
TOTAL		**14**

Spring Semester		**Credit Hours**
RESP308	Disease Management II	3
RESP318	Clinical Application II 3	
RESP323	Cardiopulmonary Physiology II	4
RESP346	Ventilatory Support with Laboratory	5
TOTAL		**15**

Summer Semester		**Credit Hours**
RESP319	Clinical Application III: Comprehensive Respiratory Care I	4
RESP309	Disease Management III	2
RESP352	Clinical Instruction and Lab II	2
RESP414	Concepts in Critical Care I	2
RESP450	Clinical Elective* (optional for this Semester)	1-3
TOTAL		**10-13**

Senior Year

Fall Semester		**Credit Hours**
ENGL302	Professional Communications I	0.5
PHRM301	Pharmacology	2
RESP347	Neonatal and Pediatric Respiratory Care	3
RESP401	Research Methods and Evidence-Based Practice In Respiratory Care	3
RESP407	Clinical Application IV: Neonatal/Pediatric Critical Care	2
RESP410	Clinical Application V: Comprehensive Respiratory Care II	3
RESP422	Sleep Disorders, Polysomnography and Sleep Technology I	1
RESP424	Senior Seminar	1
TOTAL		**15.5-17.5**

Spring Semester		Credit Hours
ENGL303	Professional Communications II	0.5
HUMA420	Ethics and Health Professions	3
RESP413	Clinical Application VI: Comprehensive Respiratory Care III	3
RESP443	Leadership and Professional Behaviors	2
RESP415	Concepts in Critical Care II	3
RESP425	Senior Seminar II	1
RESP431	Cardiopulmonary Home Care and Rehabilitation	1
RESP446	Patient Care Independent Study (Elective)*	1
	(Four 8-hour shifts w/project)	

***Students with instructor permission may petition for a different Independent Study elective when it can be accommodated**

RESP450	Clinical Elective*	1-3
RESP496	Teaching Independent Study (Elective)*	1-3
RESP497	Research Independent Study (Elective)*	1-3
RESP498	Leadership/Management Independent Study (Elective)*	1-3
TOTAL		**14.5-16.5**

TOTAL CREDIT HOURS **69-73**

Course Descriptions

RESP307 Disease Management I
1 Credit Hour
This course introduces students to the general concepts of disease management and care planning, and to specific ways in which patients are assessed, including history and physical, laboratory studies, imaging procedures, pulmonary function studies, bronchoscopy, and other techniques. Students are introduced to practice guidelines for chronic cardiopulmonary disorders including discussions of etiology, clinical manifestations, diagnosis and treatment. Emphasis is placed on the clinical management of patients including formation and evaluation of evidence-based disease management plans.

RESP308 Disease Management II
3 Credit Hours
Prerequisite: RESP307
This course continues with a review of the evidence base and practice guidelines for common cardiopulmonary disorders including discussions of etiology, clinical manifestations, diagnosis and treatment. Emphasis is placed on management of acute and critical disorders including formation and evaluation of evidence-based management plans and protocols.

RESP309 Disease Management III
2 Credit Hours
Prerequisite: RESP308
This course serves as the third and final course in the disease management sequence and continues with a review of the evidence base and practice guidelines for additional common cardiopulmonary disorders not addressed in RESP307 and RESP308, including discussions of etiology, clinical manifestations, diagnosis and treatment. Emphasis is placed on management of acute and critical disorders including formation and evaluation of evidence-based management plans and protocols.

RESP313 Cardiopulmonary Physiology I
4 Credit Hours
This course introduces the student to basic concepts leading to the understanding of the physiology of the cardiopulmonary system. Emphasis is placed on the student's understanding of normal cardiopulmonary physiology as a background for the understanding of cardiopulmonary pathophysiology.

RESP316 Teaching and Learning in Respiratory Therapy
2 Credit Hours
This course introduces the theory and practice of teaching and learning in the context of respiratory care. The course explores effective strategies for learning in educational and professional settings. The course exposes the complexities of the teaching responsibilities in respiratory care, from teaching patients and their families in hospital rooms to teaching in professional settings within respiratory care and across professional boundaries. Students assess teaching situations, rationalize effective teaching plans to address them, and practice teaching in simulated settings.

RESP317 Clinical Application I: Basic Respiratory Care
2 Credit Hours
This introductory preceptor-facilitated clinical course provides the student clinical practice at various clinical sites under direct supervision of therapist preceptors. Students apply basic therapeutic procedures learned in the laboratory setting to adult patients receiving respiratory care.

RESP318 Clinical Application II
3 Credit Hours
Prerequisite: RESP317
The student continues patient interaction and delivery of basic respiratory care procedures and is introduced to critical/ intensive care setting including patients on mechanical ventilation. Via problem and case-based learning sessions and simulation, the student continues to develop critical thinking, problem solving, clinical reasoning and inquiry skills.

RESP319 Clinical Application III: Comprehensive Respiratory Care I
4 Credit Hours
Prerequisite: RESP318
Co-requisite: RESP352
This course gives the student an opportunity to function more independently in all areas of respiratory care with an emphasis on critical care and patients on mechanical ventilation. Through more clinical, the student has the opportunity to sharpen critical thinking, problem solving, and reasoning skills in a variety of clinical settings under the direction of assigned preceptors in clinical affiliates.

RESP321 Physical Principles of Respiratory Care
2 Credit Hours
Mathematical/ algebraic, chemistry and biological concepts are reviewed to help ensure understanding of key respiratory care physical principles such as laws, properties and characteristics of gases, liquid flow under various physiologic conditions, humidity, change of state of matter, solutions, dilution calculations, mechanisms of medication action, and principles governing heat, magnetism and electricity.

RESP323 Cardiopulmonary Physiology II
4 Credit Hours
Prerequisite: RESP313
This intermediate course builds on Cardiopulmonary Physiology I with emphasis on pulmonary mechanics, acid-base balance and regulation, cardiac and cardiovascular systems, cardiac electrophysiology, electrocardiograms and cardiac arrhythmias, introduction to advanced cardiovascular life support, cardiopulmonary response to exercise in health and disease, and effects of aging on the cardiopulmonary system.

RESP343 Clinical Lab I
3 Credit Hours
This first clinical laboratory course introduces students to the application of fundamental principles and basic therapeutic procedures for the adult patient receiving respiratory care. Emphasis is placed on the application of equipment and procedures used in basic respiratory care therapeutics. This course utilizes the laboratory setting to prepare students in the application of these principles and procedures for the adult patient using case scenarios and observation of student performance in a simulated patient care environment.

RESP346 Ventilatory Support with Laboratory
5 Credit Hours
Prerequisite or Co-requisite: RESP323
This intermediate course introduces the student to the concepts and clinical application of mechanical ventilation and associated practices in all settings in which a respiratory therapist utilizes both the equipment and techniques of this form of life support. This course includes a clinical laboratory component which allows the student to apply their knowledge of the application of mechanical ventilators and related technologies and procedures in the laboratory and simulation settings.

RESP347 Neonatal and Pediatric Respiratory Care
3 Credit Hours
This course emphasizes the relationships between normal neonatal and pediatric development and cardiopulmonary physiology. Specific pathologies resulting from a variety of neonatal and pediatric conditions are discussed. Emphasis is placed on content, concepts and evidence-based practice guidelines related to the assessment, diagnosis and management of situations and conditions that may challenge and potentially compromise the cardiopulmonary system of the neonate and child. A focus on disease management and the role of the respiratory therapist is an integral part of this course.

RESP352 Clinical Instruction and Lab II
2 Credit Hours
Prerequisites: RESP343 and RESP346
This advanced clinical laboratory course is both a review of knowledge and skills in RESP343 and RESP346, and clinical courses RESP317 and RESP318. This course prepares students for application of more advanced principles, concepts and skills in critical/respiratory care, particularly mechanical ventilation.

RESP401 Research Methods and Evidence-Based Practice in Respiratory Care
3 Credit Hours
This course provides an introduction to concepts essential to research process, theory, construction and practices, in order to assist health professionals in becoming informed and critical consumers of their professional journals and the medical research literature. Emphasis is placed on understanding the process, concepts, and implementation, EBP, effectively applying search skills in locating relevant evidence in various electronic databases, applying research statistics, and judging the value of published studies with particular emphasis on statistical and clinical significance, as well as integrating and justifying clinical conclusions. This course meets Gen Ed requirements.

RESP407 Clinical Application IV Neonatal/ Pediatric Critical Care
2 Credit Hours
This advanced faculty- facilitated clinical application course is conducted in neonatal and pediatric critical care units and in floor care settings (pediatric only). Students work directly with patients receiving mechanical ventilation and other advanced life support under direct program faculty supervision and mentorship.

RESP410 Clinical Application V: Comprehensive Respiratory Care II
3 Credit Hours
Prerequisites: RESP319 and RESP414
Co-requisite: PHRM301
This advanced clinical preceptor-facilitated clinical application course is conducted in clinical affiliate hospitals, clinics, outpatient facilities and physician offices in a wide variety of geographic locations. Experiences serve as a further intensification of the summer adult critical care clinical applications course with students working under the direct supervision, guidance, and mentoring of clinical preceptors. In addition, students may rotate to a wide variety of clinical settings including both inpatient and outpatient programs.

RESP413: Clinical Application VI: Comprehensive Respiratory Care III
3 Credit Hours
Prerequisites: RESP407 and RESP410
Co-requisite RESP415
This advanced, clinical applications course is conducted in selected areas of patient care in selected clinical affiliate hospitals, labs, clinics or physician offices. Students are embedded in specified clinical rotation locations and directly supervised, mentored and assessed by selected clinical preceptors.

RESP414 Concepts in Critical Care I
2 Credit Hours
Pre-or co-requisites: RESP323, RESP348
This advanced course emphasizes concepts in critical care, including mechanical ventilation techniques, advanced cardiac and hemodynamic monitoring, as well as extracorporeal life support. Emphasis is placed on terminology, diseases, pharmacology, fluid balance, and calculations related to various patient cases, classic case examples and simulation, interpretation of clinical case study/patient data, assessing the patient's condition, initiating clinical interventions, formulation of a care plan and evaluating the impact of implemented strategies.

RESP415 Concepts in Critical Care II
3 Credit Hours
Prerequisites: RESP313, RESP323, RESP346
This advanced course builds on previous knowledge and concepts of acid-base physiology in normal individuals and then elucidates a range of primary and secondary disturbances in acid-base balance

with special attention to interplay of respiratory and renal physiology and pathophysiology. The clinical impact of these disturbances is explored through the interpretation of clinical case study/patient data, assessment of patient condition, and clinical interventions, care plans, and evaluation of implemented strategies.

RESP422 Sleep Disorders, Polysomnography and Sleep Technology I
1 Credit Hour
This classroom course includes topics in sleep disorders, diagnostics and treatment. This course builds upon the student's basic knowledge of sleep disorders covered in previous courses. This course includes the basics/physiology/pathophysiology of sleep and sleep disorders, theory and operation of sleep study instrumentation, application of respiratory care and other modalities, patient testing, sleep staging and scoring, arrhythmia recognition and other physiologic events, data acquisition, and patient management.

RESP424 Senior Seminar I
1 Credit Hour
This seminar course will use case examples to integrate critical appraisal of patient data from the electronic medical record, clinical assessment, diagnostic tests, and treatment choices associated with frequently encountered cardiopulmonary patient conditions. Students will be evaluated through a Therapist Multiple Choice credentialing self-assessment examination.

RESP425 Senior Seminar II
1 Credit Hour
This seminar course connects clinical experiences and observations with current literature to define best practices in respiratory care. This course will integrate program learning in the study of case examples. Students will take a Clinical Simulation self-assessment examination in preparation for credentialing after graduation.

RESP431 Cardiopulmonary Home Care and Rehabilitation
1 Credit Hour
This seminar course delineates, in its first half, concepts, principles and special knowledge, equipment, techniques and patients seen in the home and ancillary environments that are specific to the role of the respiratory therapist. The second half of the course is dedicated to concepts, principles, equipment, techniques and patients seen in cardiopulmonary rehabilitation programs.

RESP441 Effective Communication through Dynamic Dialogues
2 Credit Hours)
This course provides students with specific techniques using the Dynamic Dialogues method to improve communication with patients and families, as well as colleagues and peers. Students will explore the rationale for this technique as well as the specific steps involved and will demonstrate mastery through observation and critique of patient and family interactions using Dynamic Dialogues.

RESP442 Advanced Studies in Disease Management
2 Credit Hours
This course provides an in-depth analysis of chronic airway disease including the spectrum of obstructive airway disease, assessment and therapy along the spectrum, fixed vs. dynamic airway obstruction, evaluating patient outcomes, and ongoing review of the evidence base. Ethical considerations and palliative care are included in the course content.

RESP443 Leadership and Professional Behaviors
1 Credit Hour
This seminar course will focus on core values, generic abilities and the development of professional behaviors. The principles and foundational elements necessary for practicing in the professional realm of respiratory therapy and in the health care environment are reviewed with a focus on issues relating to standards of practice, communication, implementation of change, professionalism, effective leadership, and interpersonal and professional relationships.

RESP446 Patient Care Independent Study (Elective)
1 Credit Hour
This clinical application course is conducted in various clinical affiliates as assigned by the Director of Clinical Education. Experiences serve as an optional, elective, intensification, and remediation of clinical coursework with students working under the direct supervision, guidance, and mentoring of selected clinical preceptors.

RESP450 Clinical Elective
1-3 Credit Hours
This advanced clinical preceptor-facilitated clinical application course is conducted in various clinical affiliates. Experiences serve as an optional, elective intensification of clinical coursework under INI.

RESP496 Teaching Independent Study (Elective)
1-3 Credit Hours
The student is paired with an educator in one of the Department's affiliate organizations and/or with faculty within the academic department itself. The student works with the guidance of this mentor/these mentors to assist him/her/them in one or more of the following teaching venues: clinical laboratory, classroom, clinical, community.

RESP497 Research Independent Study (Elective)
1-3 Credit Hours
The student is paired with an experienced researcher in one of the Department's affiliate organizations and/or with faculty within the academic department itself. The student works with the guidance of this mentor/these mentors to assist him/her/them in a new and/or on-going research project.

RESP498 Leadership/Management Independent Study (Elective)
1-3 Credit Hours
The student is paired with a manager/leader/ supervisor in one of the Department's affiliate organizations. The student works with the guidance of this mentor and/or his/her designee to assist the mentor in a mutually agreed upon project that somehow assists the mentor in the operations within the affiliate organization.

College of Medicine

SUNY Upstate Medical University's Norton College of Medicine has been educating students to become doctors for 190 years. Our nationally recognized faculty received their medical training at some of the most prestigious medical schools, residency, and fellowship programs in the country. Our students are motivated and driven, yet very supportive of one another. All of this translates into an excellent education, which is evident in our graduates' success. The Norton College of Medicine traces its origins to 1834 when Geneva Medical College, one of the nation's first medical schools, was founded in Geneva, NY. While still in its infancy, Geneva Medical School gained the distinction of admitting Elizabeth Blackwell who became the first woman in the United States to graduate from medical school, first in her class. Geneva Medical School moved to Syracuse in 1871 to join the newly formed Syracuse University (SU). The SU College of Medicine expanded and in 1934, President Franklin D. Roosevelt laid the cornerstone of what is now Weiskotten Hall, Upstate's main basic science, laboratory, and instruction complex. In 1950, the College of Medicine was transferred from Syracuse University to the newly organized State University of New York and became SUNY Upstate Medical Center, one of two regional academic medical centers, the other in Brooklyn. Briefly called SUNY Health Science Center at Syracuse, the institution became SUNY Upstate Medical University in 2000.

MD Program

CIP Code: 51.1201

Fully accredited by the Liaison Committee on Medical Education, the MD Curriculum is ever evolving to meet the needs of students and to address the health of patients. The plan of instruction and required courses outlined below may be modified subsequent to publication of the Academic Catalog. For further information, please contact the Associate Dean for Undergraduate Medical Education.

The Norton College of Medicine offers a traditional four-year degree as well as a three-year pathway. The three-year pathway leads to matriculation into a selected number of residency programs at Upstate Medical University. More about the three-year pathway can be found at: https://www.upstate.edu/com/special_opps/md-program/3-year-program.php .

In addition, combined degrees are available: MD/MBA, MD/MPH, and MD/PhD. More information can be found at: https://www.upstate.edu/com/special_opps/index.php

Objectives and Plan of Instruction

Faculty of the Norton College of Medicine believe that broad exposure to both foundational sciences and clinical disciplines is the best preparation for a medical career in a rapidly evolving health care environment. The curriculum provides integrated teaching of foundational and clinical sciences. The Graduation Competencies and Educational Program Objectives of the Norton College of Medicine are defined and approved by the Curriculum Committee and disseminated to all faculty, students, and others responsible for the educational process. These objectives for the medical education program serve as statements of the knowledge, skills, behaviors, and attitudes that students are expected to learn or accomplish during the course of medical school at Upstate and assessments are driven from them. The Graduation Competencies and Educational Program Objectives are available online at: http://www.upstate.edu/com/curriculum/objectives.php

Two campuses for clinical clerkships:

All students spend the first three semesters in pre-clerkship study at the main campus in Syracuse, NY. Three quarters of the class remain in Syracuse for their required core clinical clerkships and one quarter complete those clerkships in Binghamton, NY. Fourth year students can take electives at either campus.

Syracuse Campus

Students who take their core clerkships at the Syracuse campus rotate through Upstate University Hospital, Upstate Golisano Children's Hospital, Upstate Community Hospital, the Syracuse VA Hospital, Crouse Hospital, Hutchings Psychiatric Hospital, and a variety of ambulatory practice sites throughout central New York.

University Hospital sponsors a Level I Trauma Center and its Poison Control Center services half of the counties in New York State. University Hospital includes multiple primary care and specialty programs, including the Upstate Cancer Center, the Upstate Stroke Center, the Clark Burn Center, the Designated AIDS Center (DAC), and the Joslin Center for Diabetes.

Binghamton Campus

The Binghamton Campus was established as a branch campus of the Norton College of Medicine in 1976. Students who take their core clerkships in Binghamton rotate through UHS Wilson Medical Center, UHS Binghamton General Hospital, UHS Chenango Memorial Hospital and Ascension Lourdes Hospital, as well as a network of family care and ambulatory sites. Through these clinical affiliates, the Binghamton program offers the same required clerkships as the Syracuse program. There is an emphasis on community-based medicine, continuity with attending physicians, and continuity with patients.

UHS Wilson Medical Center offers all of the clinical services associated with a large, acute-care facility including a perinatal center, neonatal intensive care unit, Level II Trauma Center, cardiac center, and center for neuroscience. UHS Binghamton General Hospital includes a center for reconstructive surgery, a renal dialysis unit, a sleep disorders unit, mental health services and substance abuse services. Our Lady of Lourdes Memorial Hospital (Ascension Lourdes) includes emergency care, a surgery center, breast care center, a Regional Cancer Center, and a hospice program.

Student Research Opportunities

Research is an important aspect of medical education at Upstate Medical University, and the Norton College of Medicine faculty strongly support student participation in research. There are many opportunities for medical students to pursue research interests throughout their four years and students are encouraged to do so. Summer research opportunities are available between the first and second year of the program. Many departments offer research elective courses at both the Syracuse and Binghamton campuses. For information about research elective courses and opportunities please refer to the Norton College of Medicine Course Selection Book.

MD Curriculum Overview *

For classes entering in 2024 forward in the Four-Year Pathway:

Required Year 1 Courses (First and Second Semester):

	Credit Hours
MMCM102 Molecules, Cells & Microbes	6.5
MFSC101 Foundations, Skin & Cancer	5
MMSK101 Musculoskeletal	6
MANA101 Applied Neuroanatomy	4
MCVS101 Cardiovascular System	5
MRSP101 Respiratory System	4
MKUS101 Kidney & Urinary System	4
MHSS101 Health Systems Science 1	2
MHSS102 Health Systems Science 2	2
MCNS101 Clinical Neuroscience 1	2.5
MCNS102 Clinical Neuroscience 2	2.5
MFRM101 Foundations of Reasoning in Medicine 1	1.5
MFRM102 Foundations of Reasoning in Medicine 2	1.5
MLCP101 Longitudinal Clinical Preceptorship 1	2.5
MLCP102 Longitudinal Clinical Preceptorship 2	1.5
MPOM105 Practice of Medicine 1	2
MPOM106 Practice of Medicine 2	1.5
CAPD 101 Career Advising and Professional Development 1	0.5
TOTAL YEAR 1	**54.5**

Required Third Semester Courses:

	Credit Hours
MERS101 Endocrine and Reproductive Systems	7
MGSN101 Gastrointestinal System and Nutrition	7
MBLR101 Blood and Lymphoreticular System	4
MHSS103 Health Systems Science 3	2
MCNS103 Clinical Neuroscience 3	2.5
MFRM103 Foundations of Reasoning in Medicine 3	1.5
MLCP103 Longitudinal Clinical Preceptorship 3	1.5
MPOM107 Practice of Medicine 3	1.5
CAPD201 Career Advising and Professional Development 2	0.5
TOTAL SEMESTER 3	**27.5**

Required Courses and Core Clerkships:

	Credit Hours
MDCN2000 Internal Medicine	10
FAMP1600 Family Medicine	5
PYCH6800 Psychiatry	5
PEDS5600 Pediatrics	5
NEUR3000 Neuroscience	5
OBGY3600 Obstetrics/Gynecology	5
SURG8200 Surgery and Surgical Subspecialties	7
EMED1300 Emergency Medicine	3
CBHX 2400 Clinical Bioethics	1
PRVM6400 Population Health for Physicians	0.5
TOTAL CLERKSHIP CREDITS	**46.5**
CAPD301 Career Advising and Professional Development 3	0.5
TOTAL CLERKSHIP YEAR	**47**

Required Fourth Year

	Credit Hours
Electives (see distribution below)	32
INTD9100 Transition to Residency	3
CAPD401 Career Advising and Professional Development 4	0.5
TOTAL YEAR 4	**35.5**

Total Credit Hours for the Four-Year Pathway: 164.5

The Program of Study for the Three-Year Pathway is the same as the Four-Year Pathway with the following exceptions:

- Students in the Three-Year Pathway are required to take 19 elective credit hours instead of 32. Eight of these elective credits will be taken in the summer between the first and second year in electives sponsored and approved by the department of the residency the student has chosen to enter.
- Students in the Three-Year Pathway will take Transition to Residency and Career Advising and Professional Development 3 and 4 in the third year of medical school.
- **Total credit hour requirement in the Three-Year Pathway is 151.5.**

For more information about the Three-Year Pathway, go to https://www.upstate.edu/com/special_opps/md-program/3-year-program.php .

For classes entering in 2023 in the Four-Year Pathway:

Required Year 1 Courses (First and Second Semester):

	Credit Hours
MMCM102 Molecules, Cells & Microbes	5.5
MFSC101 Foundations, Skin & Cancer	5
MMSK101 Musculoskeletal	6
MANA101 Applied Neuroanatomy	4
MCVS101 Cardiovascular System	5
MRSP101 Respiratory System	4
MKUS101 Kidney & Urinary System	4
MHSS101 Ethics, Equity & Professionalism	1
MHSS102 Population Health & Preventive Medicine	1
MHSS103 Epidemiology, Statistics, & Study Design	1
MHSS104 Health Policy, Finance, & Delivery	1
MHSS105 Health Policy, Law, & Advocacy	1
MCNS101 Clinical Neuroscience 1	2.5
MCNS102 Clinical Neuroscience 2	2.5

MFRM101 Foundations of Reasoning in Medicine 1	1.5
MFRM102 Foundations of Reasoning in Medicine 2	1.5
MLCP101 Longitudinal Clinical Preceptorship 1	2.5
MLCP102 Longitudinal Clinical Preceptorship 2	1.5
MPOM105 Practice of Medicine 1	2
MPOM106 Practice of Medicine 2	1.5
CAPD 101 Career Advising and Professional Development 1	0.5
TOTAL YEAR 1	**54.5**

Required Third Semester Courses:

	Credit Hours
MERS101 Endocrine and Reproductive Systems	7
MGSN101 Gastrointestinal System and Nutrition	7
MBLR101 Blood and Lymphoreticular System	5
MHSS106 Health Humanities	1
MCNS103 Clinical Neuroscience 3	2.5
MFRM103 Foundations of Reasoning in Medicine 3	1.5
MLCP103 Longitudinal Clinical Preceptorship 3	1.5
MPOM107 Practice of Medicine 3	1.5
CAPD201 Career Advising and Professional Development 2	0.5
TOTAL SEMESTER 3	**27.5**

Required Courses and Core Clerkships:

	Credit Hours
MDCN2000 Internal Medicine	10
FAMP1600 Family Medicine	5
PYCH6800 Psychiatry	5
PEDS5600 Pediatrics	5
NEU3000 Neuroscience	5
OBGY3600 Obstetrics/Gynecology	5
SURG8200 Surgery and Surgical Subspecialties	7
EMED1300 Emergency Medicine	3
CBHX2400 Clinical Bioethics	1
PRVM6400 Population Health for Physicians	0.5
TOTAL CLERKSHIP CREDITS	**46.5**
CAPD301 Career Advising and Professional Development 3	0.5
TOTAL CLERKSHIP YEAR	**47**

Required Fourth Year

	Credit Hours
Electives (see distribution below)	32
INTD9100 Transition to Residency	3
CAPD401 Career Advising and Professional Development 4	0.5
TOTAL YEAR 4	**35.5**

Total Credit Hours for the Four-Year Pathway: 164.5

The Program of Study for the Three-Year Pathway is the same as the Four-Year Pathway with the following exceptions:

- Students in the Three-Year Pathway are required to take 19 elective credit hours instead of 32. Eight of these elective credits will be taken in the summer between the first and second year in electives sponsored and approved by the department of the residency the student has chosen to enter.
- Students in the Three-Year Pathway will take Transition to Residency and Career Advising and Professional Development 3 and 4 in the third year of medical school.

Total Credit Hour requirement in the Three-Year Pathway: 151.5

For more information about the Three-Year Pathway, go to https://www.upstate.edu/com/special_opps/md-program/3-year-program.php .

For classes that entered between 2016 and 2022:

Required First Year Courses:

	Credit Hours
MMCM102 Molecules, Cells & Microbes	8
MMSK101 Musculoskeletal	5
MNSY101 Nervous System I	6
MCVR101 Cardiovascular, Respiratory I	5
MURR101 Urinary & Respiratory II	4
MGSI101 Gastrointestinal I	5
MENR101 Endocrine, Reproductive	4
MPTP101 Patients to Populations: Ethics, Law, and Population Health	2.5
MFRM101 Foundations of Reasoning in Medicine 1	2.5
MPOM105 Practice of Medicine 1	7
TOTAL YEAR 1	**49**

Required Second Year Courses:

	Credit Hours
MFSK201 Foundations & Skin	5
MHON201 Hematology & Oncology	4
MNSY201 Nervous System II	5
MCVR201 Cardiovascular, Respiratory II	5
MENR201 Renal, Reproductive, Endocrine	5
MGSI201 Gastrointestinal II	4
MPOM201 Practice of Medicine II	8
MFRM201 Foundations of Reasoning in Medicine II	5
TOTAL YEAR 2	**41**

Required Third Year Clerkships:

	Credit Hours
MDCN2000 Medicine	10
FAMP1600 Family Medicine	5
PYCH6800 Psychiatry	5
PEDS5600 Pediatrics	5
NEUR3000 Neuroscience	5
OBGY3600 Obstetrics/Gynecology	5
SURG8200 Surgery and Surgical Subspecialties	7
EMED1300 Emergency Medicine	3
CBHX2400 Clinical Bioethics	1
PRVM6400 Population Health for Physicians	0.5
TOTAL YEAR 3	**46.5**

Required Fourth Year:

	Credit Hours
Electives (see distribution below)	25
INTD9100 Transition to Residency	3
TOTAL YEAR 4	**28**

* The curriculum is currently under review. Requirements and course descriptions may change.

For other information regarding elective credits, please see below.
www.upstate.edu/curriculum/courses/electives.php.

Elective Program

Students may select from more than 170 elective courses listed in the Course Selection Book. Electives are offered at Upstate University Hospital, the Binghamton Clinical Campus, and affiliated institutions. Electives may also be taken extramurally. Students are encouraged to consult their advisors to design an elective program that meets their individual interests and needs.

Beginning with the class entering in 2023, a minimum of 32 credits are required in the 4-year pathway and a minimum of 19 credit hours are required in the 3-year pathway. All students may take more than the required number of elective credits.

Within the required elective credits, students must select a 4-credit Acting Internship at Upstate and a 2-credit Basic Science Selective. In the 4-year pathway, only 20 of the required clinical elective credits may be taken in any one department, and at least 12 elective credits must be from (a) different department(s). A maximum of 12 extramural elective credits (not sponsored by an Upstate faculty member), may count toward graduation requirements. Students may take more than the minimum required number of elective credits. See additional information about electives in the Graduation Requirements Policy online.

Students in classes that entered prior to 2023 must take 25 required elective credits, which must include a 4-credit Acting Internship and a 2-credit Basic Science Selective. A minimum of 9 elective credits must be taken outside of any one specific department, and only 12 of the required elective credits may be taken in an extramural experience. Students may take more than the minimum required number of elective credits.

Graduation Requirements for the 4-Year Pathway

1. Satisfactorily complete the required and elective curriculum in the 4-year pathway.
2. Be in good standing (i.e. not on academic or disciplinary probation).
3. Pass Step 1 and Step 2 CK of the United States Medical Licensing Exam (USMLE).
4. Pass Upstate's Clinical Skills Examination (CSE).
5. Complete a minimum of 40 hours of community engagement starting with the class entering in 2023.
6. Satisfy all financial obligations due to Upstate Medical University, including at least eight semesters of tuition (except transfer students and students admitted with advance standing who must pay two semesters of tuition for every year of medical education completed at Upstate Medical University).

Graduation Requirements for the 3-Year Pathway

1. Satisfactorily complete the required and elective curriculum in the 3-year pathway.
2. Be in good standing (i.e. not on academic or disciplinary probation).
3. Pass Step 1 and Step 2 CK of the United States Medical Licensing Exam (USMLE) on the first attempt.
4. Pass Upstate's Clinical Skills Examination (CSE).
5. Complete a minimum of 30 hours of community engagement starting with the class entering in 2023.
6. Satisfy all financial obligations due to Upstate Medical University, including at least six semesters of tuition.

MD Course Descriptions

Pre-Clerkship

These course descriptions apply to students entering in 2023 forward.

CAPD101, CAPD201 Career Advising, Professional Development 1, 2
0.5 Credit Hours each
These year-long courses are part of a series of four courses, taken over the four years (or three, for accelerated students). Drawing from the AAMC Careers in Medicine Program, these courses offer sessions and activities that aim to assist students with career advising and professional development throughout medical school. Broad topics include understanding yourself, exploring career options, choosing a specialty, and preparing for residency**.**

MANA101 Applied Neuroanatomy
4 Credit Hours
This course will provide students with current scientific knowledge of human nervous system structure. Students will also begin to develop an understanding of abnormalities in nervous system structure/function and disease states. Instruction will include primary exposure to, and appreciation of, how nervous system pathology manifests in abnormal clinical and laboratory findings. This course will include significant content in neuroanatomy and anatomy of the face in addition to activities in the anatomy laboratory.

MBLR101 Blood and Lymphoreticular System
4 Credit Hours
This course covers normal formed elements of peripheral blood as well as benign, infectious, and malignant disorders of blood and lymphatic organs. Hematopathology and molecular diagnostics are emphasized in the differential diagnosis of leukemias and lymphomas. Inherited, acute, and acquired blood disorders are studied, including defects in the development of blood cells and blood clotting factors. The selective and appropriate use of blood components in transfusion medicine are presented. Blood-borne pathogens are discussed with an emphasis on clinical presentation and differential diagnosis.
(For students in classes that enter in 2023, this course earns 5 credit hours)

MCNS101 Clinical Neuroscience 1
2.5 Credit Hours
This course is a competency-based longitudinal core curriculum in medical neuroscience, which spans the entire pre-clerkship curriculum. The course will provide students with a strong foundation in foundational and clinical science, which lays the groundwork for development of integrative skills by which students can compare and contrast similar findings across disease processes seen in various settings, courses, and medical practice. The first semester of the course will be focused largely on neurobiology and neuropathology.

MCNS102 Clinical Neuroscience 2
2.5 Credit Hours
This course is the Spring semester continuation of the Fall course, MCNS101, additionally addressing the neurological and behavioral sciences, with emphasis on neurological sciences.

MCNS103 Clinical Neuroscience 3
2.5 Credit Hours
This course is the final Fall semester continuation of the three semester course series (MCNS101, 102), which integrates and emphasizes foundational and clinical sciences relevant to neurological and behavioral sciences. This includes clinically oriented presentation, function, pathophysiology, diagnosis, and treatment of common neurologic and psychiatric conditions; longitudinal integration of the nervous system with concurrent organ-system units, further development of neurologic and psychiatric examination skills.

MCVS101 Cardiovascular System
5 Credit Hours
This course will emphasize medical knowledge as it applies to normal anatomic structure and physiologic function of the heart and blood vessels and progress to an understanding of common cardiovascular diseases and their treatments. Clinical cases, radiographic imaging, and clinical testing modalities such as electrocardiograms (EKGs) will be presented to support integration and application of clinical content.

MERS101 Endocrine and Reproductive Systems
7 Credit Hours
Students will learn to recognize and describe the normal and pathological structures and functions of the major endocrine and reproductive organs and glands, and associated pharmacotherapies. This includes the intricate interplay of hormonal pathways contributing to normal endocrine and reproductive functions. Using clinical, laboratory, radiologic, and pathologic data, students will identify the ways in which the balance of these systems can be disturbed, leading to endocrine and reproductive disorders. Foundational sessions on nutrition, vitamins, and minerals are also presented.

MFSC101 Foundations, Skin, and Cancer
5 Credit Hours
This course will introduce foundational principles of microscopic anatomy, general pathology, and pharmacology in addition to mechanisms of human development and embryogenesis. Skin (dermatology) will be used as the main organ system to introduce clinical applications of these foundational topics using the study of normal and abnormal tissue and the application of drugs in dermatology. In addition, the overall use of antibiotics (antiviral, antibacterial, and antifungal applications) will be introduced. Finally, the pathophysiology of cancer including cancer genetics and cancer therapeutics (chemotherapy, molecular targeting, and radiation) will be discussed.

MFRM101 Foundations of Reasoning in Medicine 1
1.5 Credit Hours
This longitudinal course integrates clinical medical reasoning into our curriculum and is designed to promote the thought processes necessary to develop a student's intellectual capacity as a practicing physician. FRM is an active, case-based learning course that integrates with the horizontally constructed system-based courses. The course emphasizes the foundational science underpinning the clinical reasoning skills necessary to evaluate patients, understand disease, and make rational, evidence-based decisions. These small group sessions involve evidenced based medicine, small group presentations and active participation with self-directed learning. Students are given the case topic and preparatory learning materials in advance of each session.

MFRM102, MFRM103 Foundations of Reasoning in Medicine 2
1.5, 1.5 Credit Hours
The continuation of the Fall semester course, MFRM101, administered in the Spring and following Fall semesters. As the course progresses, students are no longer given the topic in advance, masking the diagnosis. They will use these sessions to work through clinical cases to elicit the main teaching points of the sessions, obtain a patient history and physical exam, develop differential diagnoses, and form concept maps for the diagnosis and treatment of the disease their simulated patients will possess. This course will also expose students to the domains of ethics, law, biostatistics, epidemiology, economics, public policy, and population health.

MGSN101 Gastrointestinal System and Nutrition
7 Credit Hours
This course covers the development, anatomy, and physiology of the gastrointestinal (GI) system, the related pathways of metabolism, and the pathology and treatment of common GI related diseases/conditions. Students will interpret, integrate, and demonstrate the structural, metabolic, and physiological function of the GI tract in a normal state, understand specific disease states and clinical presentations, as well as how they arise from changes in physiology, cell structure, and metabolic function.

MHSS101, MHSS102, MHSS 103 Health Systems Science 1, 2, 3
2, 2, 2 Credit Hours Each
In this three-semester longitudinal course, students will explore topics in health systems science through two weeklong thematic sessions per semester. Topics include ethics, equity, and professionalism, biostatistics, epidemiology, and study design, healthcare finance and delivery, population health and preventative medicine, health humanities, health policy law and advocacy. Instruction and assessment in this course employ many learning and assessment modalities which rely on active participation, including small group discussion, clinical cases, reflections, and in class writing assignments.
(These iterations of MHSS101 are required only for students in classes that enter in 2024 and beyond.)

MHSS101 Ethics Equity and Professionalism
1 Credit Hour
This health systems science intensive (the first of six) will cover core topics in ethics, equity, and professionalism. The content will be delivered through a combination of small- and large-group interactive sessions and self-directed learning, including guided case analysis, discussion of readings and a film, and simulation/roleplay. Assessments will include participation in small group activities and an open-book, case-based final examination.
(This iteration of MHSS101 is required only for students in classes that enter in 2023.)

MHSS102 Population Health and Preventive Medicine
1 Credit Hour
This health systems science intensive will explore key determinants of individual and population health and various methods to promote health and prevent illness. Students will learn how physicians can systematically evaluate evidence and care for a population of people, helping to bridge the gap between individual clinical care and public health. The content will be delivered through a combination of small- and large-group interactive sessions, case-based learning, and self-directed learning. Assessments will include short answer quizzes, problem sets, and reflections throughout the week. ***(This iteration of MHSS102 is required only for students in classes that enter in 2023.)***

MHSS103 Epidemiology, Biostatistics, and Study Design
1 Credit Hour
This health systems science intensive will cover core topics in the disciplines of epidemiology, biostatistics, and study design. The material will be delivered through daily lectures, and individual and small group activities will be utilized to apply and enhance understanding from lectures. Assessments will include individual reading and reflections, problem sets, and completion of CITI training. ***(This iteration of MHSS103 is required only for students in classes that enter in 2023.)***

MHSS104 Health Policy, Finance and Delivery
1 Credit Hour
This health systems science intensive will examine the structure of the US health care system, focusing on the financing and delivery of health services, and the intersection of medical care and public health. Students will learn about key players, their roles in the system, different remuneration methodologies, and study other common models of health care delivery and finance outside the US. Emphasis is also placed on the characteristics of a quality health system, principles of quality improvement and patient safety. Course activities will include small group activities, case-based learning, lectures, expert panels and IHI online modules. Students will be assessed through reflections and completion of IHI modules. ***(MHSS104 is required only for students in classes that enter in 2023.)***

MHSS105 Health Policy, Law, and Advocacy
1 Credit Hour
This health systems science intensive will explore the role of physicians as advocates who can inform health policy and law. Students will work through health care ethics problems based on reproductive health, incarceration and health, and immigrant health cases, and will learn skills such as storytelling, working with professional organizations, writing opinion pieces, and meeting with policymakers and community-based organizations to support health and health care access. The material will be delivered through individual and small group activities and community-engaged learning. Assessments will include daily reflections, short in-class writing assignments, and an opinion piece. ***(MHSS105 is required only for students in classes that enter in 2023.)***

MHSS106 Health Humanities
1 Credit Hour
This health systems science intensive guides students to understand narrative, literature, and the arts as offering resources and methods for developing capacities for analysis, reflection, and resilience, strategies and skills for communication and connection, and knowledge about patients' experiences, cultures, and communities. Students will be introduced to the ways in which individuals and communities promote health and healing through literature and arts based engagements and helps them to recognize arts in the community as resources for healthcare and public health. ***(MHSS106 is required only for students in classes that enter in 2023.)***

MKUS101 Kidney and Urinary System
4 Credit Hours
After the completion of this course, students will be able to describe the micro and macro structures and functions of the kidney and urinary system. They will demonstrate a strong understanding of the mechanisms of renal physiology and will be able to apply these concepts of physiology to further comprehend the pathophysiological basis of different disease conditions that affect kidneys and bladder, and various pharmacological approaches to treat those diseases. These foundations will allow students to successfully interpret clinical scenarios encompassing, but not limited to, laboratory studies, radiologic studies, and clinical case scenarios.

MLCP101, MLCP102 Longitudinal Clinical Preceptorship 1
2.5, 1.5 Credit Hours
Through the first two semesters of this three-semester longitudinal course students will be granted access to clinical outpatient offices for one half day every other week. Students will be assigned a clinical preceptor, who will remain the same throughout their outpatient assignment. Students will be expected to participate directly in patient care, taking on increasing responsibilities as the year progresses. Goals will be established for each session integrating material learned in LCP/POM Bootcamp and the POM course. During the course, students are expected to gain experience in a clinical setting, so they are well prepared to enter clerkships as members of patient care teams. This course will also allow the student to recognize and learn the roles of the physician, non-physician providers and support staff in the functioning of an outpatient medical practice. As these sessions continue throughout the duration of the pre-clerkship curriculum, students will begin to apply the basic sciences/foundations of medicine to their clinical experiences and patient care. Other focuses of this course include professionalism, patient care, effective communication, and patient interaction.

MLCP103 Longitudinal Clinical Preceptorship 3
1.5 Credit Hours
The final Fall semester continuation of the three semester course series (MLCP101, 102). This semester, students will be assigned to a team on a specific inpatient unit. Students will be expected to round with the team per their established protocol and interact with patients before and after rounds. In addition to continuing to apply their understanding of foundational sciences and health systems sciences to their clinical experiences and patient care, students will acclimate themselves to the way the hospital operates.

MMCM102 Molecules, Cells, & Microbes
6.5 Credit Hours
This course presents foundational material in the subject areas of Bacteriology, Virology, Parasitology, Cell and Molecular Biology, Microscopic Anatomy, Biochemistry, Genetics, Developmental Biology, and Immunology. Course material will be enhanced with frequent illustrations of patient care applications in interactive lectures and clinically oriented small group sessions. This course provides a bridge from students' undergraduate foundational science courses to the clinically oriented organ courses. ***(For students in classes that entered in 2023, this course earns 5.5 credits.)***

MMSK101 Musculoskeletal System
6 Credit Hours
Students will learn the development, clinical implications, and physiology of normal and microscopic anatomy of the musculoskeletal system, including muscles, bones, neurovascular supply, and joint structures. Students will begin cadaver dissection. Students will learn bone, joint, muscle, and soft tissue pathology. Learning will be enriched by case-based sessions, radiologic demonstrations, hands on lab work, and clinically oriented small groups.

MRSP101 Respiratory System
4 Credit Hours
The content of this course spans the anatomy and physiology of the respiratory system, the pathology and pharmacology of major lung diseases, and the microbiology and radiological appearances of pneumonias. Learning Methods will include interactive lecture, flipped classroom, gross anatomy laboratory, and team based learning.

MPOM105, MPOM106, MPOM107 The Practice of Medicine 1, 2, 3
2, 1.5, 1.5 Credit Hours
Students will begin this three-semester course in basic clinical skills by participating in a Bootcamp Intensive held in collaboration with the MLCP101 course. Throughout the course, students will work closely with clinicians in small groups, developing essential skills in clinical examination, interviewing, communication skills. Asynchronous pre-work will prepare students for and complement small group learning. Students will learn how to efficiently present patients in both written and oral form and begin to learn how to develop a differential diagnosis for various patient presentations. The course will be enhanced by clinical experiences, providing exposure to various aspects of the health care system.

Core Clerkships and Required Courses

These course and clerkship descriptions apply to students that entered from 2016 to the present.

Prerequisites: Satisfactory completion of all pre-clerkship courses.

CAPD301, CAPD401 Career Advising, Professional Development 3, 4
0.5 Credit Hours each
These year-long courses are part of a series of four courses, taken over the four years (or three, for accelerated students). Drawing from the AAMC Careers in Medicine Program, these courses offer sessions and activities that aim to assist students with career advising and professional development throughout medical school. Broad topics include understanding yourself, exploring career options, choosing a specialty, and preparing for residency**.** ***(CAPD301 and CAPD401 are required only for students in classes that enter in 2023 and beyond)***

CBHX315 Clinical Bioethics, Syr/Bing Course
1 Credit Hour
In this longitudinal concurrent case-based course which spans the third year, students meet in small groups with a faculty facilitator to discuss ethical issues that present in patient care. Students bring their own cases for discussion, and faculty present cases from the literature to provide the opportunity to discuss and learn about ethical principles and a method of case analysis for ethical concerns raised in patient care.

EMED1300 Emergency Medicine, Syr/Bing Clerkship
3 Credit Hours
This rotation introduces students to core concepts and principles in Emergency Medicine. Emphasis is on focused history and physical examination skills, developing a differential diagnosis, and developing clinical care plans.
Principles of trauma care, shock and critically ill patients, and other acute life-threatening illness will be taught in the clinical setting as well as in the Simulation Center.

FAMP1600 Family Medicine, Syr/Bing Clerkship
5 Credits Hours
This ambulatory-based clerkship provides training in the basic tenets of primary, family-based care. Clinical preventive medicine and the treatment of acute and chronic diseases are emphasized in both clinical and didactic aspects of the clerkship. The goals of the clerkship are for every medical student to:

- have point-of-care training in a family doctor's office
- demonstrate competence in the core knowledge and skills of family medicine
- understand the role of the family physician

Additionally, students will recognize that high quality information, balanced with patient preferences and clinical judgement, is the basis for intelligent decision making.
Developing an understanding of the intellectual process and acquiring the skills for life-long learning will assist students in achieving the goals of the Family Medicine Clerkship. In Binghamton, this clerkship is longitudinal. Students spend one half day per week with a preceptor during third year.

MDCN2000 Internal Medicine, Syr/Bing Clerkship
10 Credit Hours
Through active participation in the care of both inpatients and outpatients, the third-year student continues to develop knowledge and skill in diagnosis, communication, note-writing, presentation as well as acquire experience in the fundamentals of treatment. Students take medical histories, perform physical examinations, and provide assessments and plans on assigned patients. Understanding of the biochemical, physiological, and psychosocial phenomena which underlie some patients' illnesses are developed on both inpatient and outpatient teams, as well as sub-specialty services.

NEUR3000 Neuroscience, Syr/Bing Clerkship
5 Credit Hours
This clerkship integrates neurology and neurosurgery instruction. Students see common and uncommon neurological disorders and obtain concentrated training in taking a neurological history and performing a neurologic examination. A core curriculum emphasizes neurologic topics common in general practice.

OBGY3600 Obstetrics/Gynecology, Syr/Bing Clerkship
5 Credit Hours
Core lectures and active participation in patient care form the basis for this clerkship. The clerkship provides clinical opportunities for students to develop skills and knowledge related to antepartum care, management of normal labor and delivery, care of the newborn, postpartum care, and common ambulatory and inpatient gynecologic concerns.

PEDS5600 Pediatrics, Syr/Bing Clerkship
5 Credit Hours
This clerkship provides students with a foundational experience in Pediatrics. Students develop basic skills in taking pediatric histories; perform physical examinations on newborns, infants, children, and adolescents; assess pediatric developmental milestones; and interpret clinical data. Preventive pediatrics is emphasized.

PYCH680 Psychiatry, Syr/Bing Clerkship
5 Credit Hours
In this clerkship, students learn interviewing techniques, refine diagnostic skills, prepare case studies, and participate in the treatment programs of the clinical unit to which they are assigned. Liaison/consultation psychiatry is also emphasized. Students learn to evaluate patients in the ED and outpatient clinics. Faculty provide seminars to review psychopathology and treatment methods.

SURG8200 Surgery and Surgical Subspecialties, Syr/Bing Clerkship
7 Credit Hours
During this clerkship, the student participates in the care and management of patients on general surgical services as well as subspecialty services. Bedside and operating room instruction is supplemented by lectures and WISE MD Case modules. Students learn to recognize problems of a surgical nature, understand the relevant pathophysiology, and gain some familiarity with surgical therapy.

PRVM6400 Population Health for Physicians, Syr/Bing Course
0.5 Credit Hour
In this longitudinal concurrent course which spans the third year, students take part in several small group discussions that cover public health, health policy, health economics, disease reporting and clinical prevention.

Students also participate in a tabletop emergency preparedness exercise and may have the opportunity for site visits.

Fourth Year

INTD9100 Transition to Residency Course
3 Credit Hours
Transition to Residency (TtR) is a course offered in late spring for fourth year students. It is designed to prepare students for their first day as an intern. It consists of lectures, small group skill sessions, and procedure sessions. The skill sessions in the course are designed to encompass some of the Core Entrustable Professional Activities (EPA) for entering residency from the Association of American Medical Colleges (AAMC).

Upstate Public Health Program

CIP Code: 51.2201

SUNY Upstate Medical University offers the Upstate Public Health Program. Upstate Public Health students strive to understand public health problems and to develop innovative methods to improve the health of their communities and larger populations. Graduates of the program will be prepared to assume leadership roles to reduce preventable diseases, injuries, and health disparities through a specialized focus on either public health methods, global health and translational science, or population health for clinicians. As an interdisciplinary degree, the MPH offers our students flexibility in regard to their interest and career aspirations. The diversity and complexity of today's public health concerns require professionals to have a broad base of knowledge, skills, and experiences.

The Upstate Public Health Program is accredited by the Council of Education for Public Health (CEPH), the independent agency recognized by the US Department of Education to accredit graduate schools of public health and certain public health programs outside of the schools of public health. CEPH assists schools and programs in evaluating the quality of their instructional, research, and service efforts, and grants accreditation to those schools and programs that meet its published criteria.

The plan of instruction and required courses outlined below may be modified subsequent to publication of the Academic Catalog.

Master of Public Health Degree (MPH)

The Master of Public Health is a professional degree which provides a population-based perspective and is designed to prepare students to investigate and manage public health problems. The Upstate Public Health MPH degree program requires a minimum of 42 credit hours and accommodates both full-time and part-time students. Full-time students have the option to complete their degree in as little as 12 months; however, students may take up to five years to complete the degree.

Most students enrolled in the MPH degree are enrolled in either the Public Health Methods or the Global Health and Translational Science Concentration. The Population Health for Clinicians Concentration is primarily for students in the dual degree MD/MPH program and for students in special pathway programs for medical school, e.g., Public Health Scholars.

Requirements of the MPH – Public Health Methods Concentration

PHM	Summer Semester	Credit Hours
Foundational	MPHP601 Principles of Epidemiology	3
Foundational	MPHP602 Principles of Biostatistics	3
Foundational	MPHP603 Principles of Environmental Health	3
Other	MPHP698 Applied Practice Experience	1
Total		**10**

PHM	Fall Semester	Credit Hours
Foundational	MPHP604 Social and Behavioral Dimensions of Public Health	3
Foundational	MPHP607 Public Health Foundations	3
Foundational	MPHP657 Public Health Research Methods	3
Concentration Specific	MPHP691 Advanced Analytic Software	3
Concentration Specific	MPHP661 Advanced Biostatistics	3
Other	MPHP698 Applied Practice Experience	1
Total		**16**

PHM	Spring Semester	Credit Hours
Foundational	MPHP606 Public Health Policy	3
Foundational	MPHP660 Program Planning and Evaluation	3
Concentration Specific	MPHP655 Advanced Epidemiology	3
Concentration Specific	MPHP689 Advanced Qualitative Methods	3
Other	MPHP Elective	3
Other	MPHP698 Applied Practice Experience	1
Total		**16**

Total credit hours = 42

Integrative Learning Experience - Comprehensive Exam
In their final semester, students take a comprehensive exam – an integrative learning experience – that incorporates all of the coursework and subject matter they have learned in the program.

Requirements of the MPH – Global Health and Translational Science

GHTS	Summer Semester	Credit Hours
Foundational	MPHP601 Principles of Epidemiology	3
Foundational	MPHP602 Principles of Biostatistics	3
Foundational	MPHP603 Principles of Environmental Health	3
Other	MPHP698 Applied Practice Experience	1
Total		**10**

GHTS	Fall Semester	Credit Hours
Foundational	MPHP604 Social and Behavioral Dimensions of Public Health	3
Foundational	MPHP607 Public Health Foundations	3
Foundational	MPHP657 Public Health Research Methods	3
Concentration Specific	MPHP624 Introduction to Global Health	3
Other	MPHP Elective	3
Other	MPHP698 Applied Practice Experience	1
Total		**16**

GHTS	Spring Semester	Credit Hours
Foundational	MPHP606 Public Health Policy	3
Foundational	MPHP660 Program Planning and Evaluation	3
Concentration Specific	MPHP655 Advanced Epidemiology	3
Concentration Specific	MPHP625 Research Development and Global Health	3
Concentration Specific	MPHP631 APE Predeparture Modules	0
Other	MPHP698 Applied Practice Experience	1
Other	MPHP Elective	3
Total		**16**

GHTS	Summer Semester, year 2	Credit Hours
Other	MPHP698 Applied Practice Experience- if needed for Abroad experience	0

Elective(s) (Minimum of 6 Credit Hours)

Total credit hours = 42

Integrative Learning Experience - Comprehensive Exam
In their final semester, students take a comprehensive exam – an integrative learning experience – that incorporates all ofthe coursework and subject matter they have learned in the program.

Requirements of the MPH - Population Health for Clinicians Concentration

PHC	Summer Semester	Credit Hours
Foundational	MPHP601 Principles of Epidemiology	3
Foundational	MPHP602 Principles of Biostatistics	3
Foundational	MPHP603 Principles of Environmental Health	3
Other	MPHP698 Applied Practice Experience	1
Total		**10**

PHC	Fall Semester	Credit Hours
Foundational	MPHP604 Social and Behavioral Dimensions of Public Health	3
Foundational	MPHP607 Public Health Foundations	3
Foundational	MPHP657 Public Health Research Methods	3
Concentration Specific	MPHP692 Randomized Controlled Trials	3
Other	MPHP Elective	3
Other	MPHP698 Applied Practice Experience	1
Total		**16**

PHC	Spring Semester	Credit Hours
Foundational	MPHP606 Public Health Policy	3
Foundational	MPHP660 Program Planning and Evaluation	3
Concentration Specific	MPHP626 Systematic Reviews	3
Concentration Specific	MPHP649 PH and Biopsychosocial Primary Care	3
Other	MPHP698 Applied Practice Experience	1
Other	MPHP Elective	3
Total		**16**

Elective(s) (Minimum of 6 Credit Hours)

Total credit hours = 42

Integrative Learning Experience - Comprehensive Exam
In their final semester of their MPH year, students take a comprehensive exam – an integrative learning experience – that incorporates all ofthe coursework and subject matter they have learned in the program.

MD/MPH Degree

Together with the MD Program, the Upstate Public Health Program offers a dual degree program for students interested in pursuing both the MD and MPH degrees. The MD/MPH typically takes five years to earn both degrees. Most students would complete the MPH courses in their first year of the program.
Students enrolled in the MD/MPH dual degree program have the option of enrolling in either the Population Health for Clinicians Concentration or the Global Health and Translational Science Concentration.

Current Medical Students (regardless of year**)** interested in pursuing their MPH should contact the Program at PublicHealth@upstate.edu.

Certificate of Advanced Study in Public Health (CAS)

The Certificate of Advanced Study in Public Health (CASPH) is a 5 course (13-15 credit hour) program of study. The certificate can be completed in as little as two semesters but students have up to three years to complete the requirements for the program.

Certificate Coursework:

Certificate of Advanced Study (CAS) in Public Health Students will work with their academic advisor to come up with a Plan of Study that will meet their Educational and Career Goals. All CAS students are required to take five Public Health courses. They can opt to take any course they choose, as long as they have already completed the prerequisites for the courses that they select.

Introduction to Biostatistics and Epidemiology Microcredential

Biostatistics and Epidemiology are at the core of the field of Public Health. This microcredential will introduce learners to the major Biostatistics and Epidemiology concepts and how they apply to the field of public health. Through examples and practical applications during their classes, students hone skills that they can later apply to the work that they do outside of the classroom.

Microcredential Coursework:
MPHP601 Principles of Epidemiology (3 Credit Hours)
MPHP602 Principles of Biostatistics (3 Credit Hours)

The microcredential will culminate with a 1,000 word micro research report. Students will complete this report upon successful completion of MPHP601 and 602.

Foundational Course Descriptions

MPHP601 Principles of Epidemiology
3 Credit Hours; period offered: summer
Prerequisites: None
This course introduces the basic principles of epidemiology applied to public health problems. The focus of this course is on epidemiologic measures and study designs. Topics covered in this course include disease transmission, levels of prevention, morbidity and mortality, surveillance, screening, descriptive and analytic study designs, bias, measures of association, causation, and ethical and professional issues in epidemiology. The application of epidemiology for the evaluation of health services and screening programs and the influence of epidemiology on public policy will be presented.

MPHP602 Principles of Biostatistics
3 Credit Hours; period offered: summer
Prerequisites: None
This course introduces the basic principles of biostatistics and requires students to apply these principles to describe and analyze public health data. Topics include descriptive statistics, probability distributions, point and interval estimation of population parameters, and hypothesis testing. A variety of one- and two-sample parametric and non-parametric tests for continuous and categorical data are also covered, as are one-factor ANOVA and simple linear regression. Students will analyze data using SPSS software, interpret results and present findings in a variety of formats.

MPHP603 Principles of Environmental Health
3 Credit Hours; period offered: summer
Prerequisites: None
This course familiarizes students with the major domains of environmental health and environmental sciences: environmental social justice, risk assessment and risk management, healthy housing and indoor air pollutants, infectious disease, water quality, occupational health and safety, toxicology, liquid and solid waste, the built environment, energy resources, outdoor air pollution, food quality and security, and global health. Student will learn how to critically appraise the literature to address an environmental event from a public health perspective. The course will use lectures, reading, and videos to deliver content and will require students to work in groups to explore different domains, content, and perspectives in environmental health.

MPHP604 Social and Behavioral Dimensions of Public Health
3 Credit Hours; period offered: fall
Prerequisites: None
This course introduces students to the social and behavioral sciences used to explain differences in society. In addition, the course focuses on behavioral factors that may influence the environment and the interactions within society. The course focuses on theories related to human behavior – individual self, interaction between individuals and the interaction within societies. The course reviews community level theories that influence health behaviors. This helps students understand how to apply theory to research and program planning and evaluation designs. This course threads in heath disparities and the impact of the social, biological, physical, and cultural factors that affect public health.

MPHP606 Public Health Policy
3 Credit Hours; period offered: spring
Prerequisites: None
The purpose of this course is to introduce students to the essential elements of health policy and policy analysis, and to explore how health policy shapes the health care environment and impacts population health. Concepts of public health policy will be reinforced through case studies and discussions about policies in action at the international, national, and local levels.

MPHP607 Public Health Foundations
3 Credit Hours; period offered: fall
Prerequisites: None
This course provides students with foundational knowledge of public health core functions and essential services. Students receive a grounding in the fundamentals necessary to approach management and administration of public health organizations. Using the framework of public health accreditation, this course addresses topics such as community health assessment, community engagement, community improvement planning, strategic planning, human resource management, budgeting, quality improvement, and systems thinking.

MPHP657 Public Health Research Methods
3 Credit Hours; period offered: fall
Prerequisites: MPHP601 and MPHP602.
Students will be expected to have introductory level knowledge of SPSS and a copy of this software.
This course introduces students to research methods commonly used in public health, and covers quantitative, qualitative and mixed methods approaches. Course topics include identifying a study question and study hypotheses, study design specifics, data acquisition methods, survey construction, data management principles, data analysis methods and dissemination of results. Students use SPSS to develop a survey, develop and manage a research data base, run appropriate data analyses, interpret and summarize the results, and prepare a presentation of their research findings in a format used at a scientific meeting.

MPHP660 Program Planning & Evaluation
3 Credit Hours; period offered: spring
Prerequisites/Co-requisites: MPHP601 and MPHP604.
This course teaches students to plan and evaluate public health interventions. Program planning is the organized design of a targeted intervention to meet a health-related problem; evaluation is the examination of the utilization, delivery, and quality of that intervention. This course equips students with the knowledge, strategies, and skills to plan, implement, and evaluate interventions and programs. It provides the principles and processes of the planning and evaluation cycle: community needs assessment; program plan; evaluation framework; data collection plan; tools and strategies for collecting and analyzing data; dissemination.

MPHP698 Applied Practice Experience
3 Credit Hours (may be split over multiple semesters); periods offered: all
Prerequisites: None
The Applied Practice Experience course immerses students in the core domains of public health within the community under the guidance of a public health preceptor. The course is designed to provide students an opportunity to apply core public health skills learned in a classroom in a real world setting. This component of the MPH degree program plays a vital role in training students to assume public health leadership positions. Students will register for 1 credit hour Applied Practice Experience for the duration of 3 semesters. Students must work on their APE requirements throughout the three semesters.

Public Health Methods Concentration Courses

MPHP655 Advanced Epidemiology
3 Credit Hours; period offered: spring
Prerequisites: MPHP601, MPHP602, and MPHP657.
This course applies advanced principles and methods in epidemiologic research. The focus of this course is the design, conduct, analysis and interpretation of epidemiologic studies. Topics include determining causal inference, selection of an appropriate study design, sampling methodologies, data collection and measurement techniques, reliability and validity, selection of appropriate statistical tools, and evaluation of bias, confounding and effect modification.

MPHP661 Advanced Biostatistics
3 Credit Hours; period offered: fall
Prerequisite: MPHP602.
This course focuses on applying general principles and methods of general linear modeling to the analysis of continuous and categorical data. Topics include simple and multiple linear regression, logistic regression, single and multi-factor analysis of variance (ANOVA), analysis of covariance (ANCOVA) and ANOVA for repeated measures. Knowledge of course content is applied to the development and completion of a research project. Project components include formulation of research questions and hypotheses, evaluation and selection of public- access or other available datasets for research, data cleaning and analysis using statistical software, and interpretation and presentation of results in graphic and oral formats.

MPHP689 Advanced Qualitative Methods
3 Credit Hours; period offered: spring
Prerequisite: MPHP657.
The purpose of this course is to help prepare MPH students with a qualitative skillset for both research and evaluation. Qualitative research focuses on the analysis of qualitative (e.g. open-ended interviews, focus groups, content analysis, community based participatory research) data. Instruction in data collection, thematic coding, interpretation and presentation of results is included. The course considers the complementary means by which qualitative and quantitative methods may be used towards a single research or evaluation goal. Students will use NVivo software.

MPHP691 Advanced Analytical Software
3 Credit Hours; period offered: fall
Prerequisites: None
This course will introduce students to syntax-based statistical software programming using SAS and qualitative data analysis software (Atlas). Topics will include advanced data management and manipulation techniques related to the customization of both tabular and graphic deliverable output; quantitative data visualization and modeling; and the coding, analysis, and visualization of qualitative data using analytic software.

Global Health and Translational Science Concentration Courses

MPHP624 Introduction to Global Health
3 Credit Hours; period offered: summer
Prerequisites: None
Global health is the interdisciplinary approach to studying the health of populations across the world, irrespective of national or political boundaries. Students learn about key stakeholders, priorities, funders; the Global Burden of Disease Study; comparative health systems; and the interplay between health, ethics, culture and social justice in international healthcare and research settings. Students explore important topics in global health contributing to the sustainability and health of global populations. They learn about opportunities and challenges faced by public health practitioners working in global health to increase equity, access, and ensure quality.

MPHP625 Research and Development for Global Health
3 Credit Hours; period offered: spring
Prerequisites: None
Students learn the timeline and scope of developing solutions to global health problems; how to deconstruct the problem; understand components and factors that contribute to the problem; and characterize populations who are impacted. The course uses real world examples to proceed stepwise through the research and development pathway to identify a research question, design a study and subsequent experiments, regulatory and quality approval pathways, deployment of solutions, and post marketing research. Students will learn how to design and execute a study through each segment of the translational science pathway.

MPHP631 Pre-Departure Modules for International Experience
0 Credit Hours; period offered: spring
Prerequisites: None
For international experiences students are required to adhere to SUNY Upstate Medical University International Travel Policy which requires the student to complete a checklist of pre- departure training modules and required forms. The process is administered by the Institute for Global Health and Translational Science. This course allows students to complete all required documentation and training according to SUNY policy.

MPHP655 Advanced Epidemiology
3 Credit Hours; period offered: spring
Prerequisites: MPHP601, MPHP602, and MPHP657.
This course applies advanced principles and methods in epidemiologic research. The focus of this course is the design, conduct, analysis and interpretation of epidemiologic studies. Topics include determining causal inference, selection of an appropriate study design, sampling methodologies, data collection and measurement techniques, reliability and validity, selection of appropriate statistical tools, and evaluation of bias, confounding and effect modification.

Population Health for Clinicians Concentration Courses

MPHP626 Systematic Reviews
3 Credit Hours; period offered: spring
Prerequisites: None
Systematic review is a technique that offers a standardized framework to synthesize and assess the quality of the literature on a specific research topic. Systematic reviews can provide insight on which interventions, programs, and policies are the most effective to address diverse health and social welfare problems among our patients and the public. Systematic reviews also enable us to learn about the gaps in knowledge and limitations in existing literature to guide future public health practice, research, and policy. This course covers the entire range of conducting a systematic review such as framing a review question; implementing a search strategy; synthesizing data extracted from eligible studies; and introduces concepts and software to implement a meta-analysis.

MPHP649 Public Health and Biopsychosocial Primary Care
3 Credit Hours; period offered: spring
Permission of instructor required.
This course is intended for students with clinical interests or backgrounds and covers the application of the Biopsychosocial Model of Care to primary care settings. In the process students apply population-level, public health skills to the management of individual patients or clients. The course includes discussion of cultural competency and humility, social determinants of health, health disparities, motivational interviewing and stages of change, the chronic care model, and stages-of-change theory. Students encounter a standardized patient who presents with a combination of newly emergent chronic biological illness, co-morbid behavioral symptoms, and social stressors, in a formative session.

MPHP692 Randomized Controlled Trials
3 Credit Hours; period offered: fall
Prerequisites: MPHP601, MPHP602
Randomized controlled trials (RCTs) are the gold standard for evaluating the effectiveness of interventions, prevention strategies, and treatments. This course covers key components of RCT design, conduct, and analysis; various types of trials (clinical, field, community trials); and treatment allocation designs (parallel, crossover, cluster). Topics include representation in study populations, developing and deploying randomization lists, blinding/masking strategies, selecting outcomes, calculating sample sizes, and types of statistical analyses. Basic ethical principles such as informed consent, privacy, and confidentiality, are discussed. Emphasis is placed on critically evaluating RCTs for methodological rigor, and how design choices influence the risk of bias.

MPHP655 Advanced Epidemiology
3 Credit Hours; period offered: spring
Prerequisites: MPHP601, MPHP602, and MPHP657.
This course applies advanced principles and methods in epidemiologic research. The focus of this course is the design, conduct, analysis and interpretation of epidemiologic studies. Topics include determining causal inference, selection of an appropriate study design, sampling methodologies, data collection and measurement techniques, reliability and validity, selection of appropriate statistical tools, and evaluation of bias, confounding and effect modification.

MPH Electives

MPHP627 Public Health Ethics
3 Credit Hours; periods offered: fall and spring (periodically)
Prerequisites: None
This course addresses ethical issues in public health. Public health ethics is a new area of scholarship and practice that addresses population- level health issues, including issues such as food stamps and health insurance, immunizations, public health research, legal and policy responses to infectious diseases and epidemics, and the role of religious and social values in setting health policy.

MPHP628 Service Learning and Community Health
2 Credit Hours; periods offered: fall and spring (periodically)
Prerequisites: None
This elective introduces basic principles of community health from the perspective of community organizations invested in promoting health and wellness. Students provide service to the community while learning from and about the community. The course allows students to learn about their role as future health care professionals and their impact on the health of the community. It has **two** components: 1) *In-Class Sessions*: Students attend, engage and reflect on the learning activity as it relates to community health issues. 2) *Planned Service Activities:* Students engage in planned service activities that are integrally related to course content.

MPHP647 Research and Writing for Public Health
3 Credit Hours; periods offered: all
Prerequisites: None
Students will learn several aspects of writing for research, including the identification of a research question and appropriate methodology, conducting and writing a focused literature review (or Introduction/Background section of a paper), documenting a methodological approach, running and writing an analysis, and interpreting results in a discussion/conclusion section.

MPHP648 Culture, Communication & Ethics in Healthcare: Deaf & Disability Studies Approaches
3 Credit Hours; periods offered: fall and spring (periodically)
Prerequisites: None
This course provides a model for collaborative and culturally sensitive and skilled communication in health care. Through the study of ethics cases, narratives, and literature, students analyze disparities and discrimination in health care for people who are deaf and disabled. Students explore solutions through deaf studies, disability studies, and narrative approaches. Guest speakers include members of the deaf community, disability studies scholars and advocates, sign language interpreters, and health care professionals. Community educators serve as experts who engage the students throughout the process.

MPHP652 Infectious Disease Epidemiology
3 Credit Hours; period offered: fall and spring (periodically)
Prerequisites: MPHP601, MPHP602, and MPHP657.
This course explores the epidemiology of globally important infectious diseases and covers basic epidemiologic methods, pathogenesis of selected infectious diseases, and case-studies on performing outbreak investigations and developing population studies to understand the spread, transmission and prevention of infectious diseases. Particular emphasis is placed on understanding laboratory techniques for the identification and quantification of infectious agents and their use during outbreak investigations. This course provides an introduction to infectious disease epidemiology and will focus on the tools of basic epidemiology.

MPHP653 Chronic Disease Epidemiology
3 Credit Hours; period offered: periodically
Prerequisites: MPHP601 and MPHP602.
This course applies the methods and principles of epidemiology to the study of chronic diseases, including: cancer, cardiovascular disease, asthma and allergy, obesity/diabetes/metabolic syndrome, and musculoskeletal disorders. Theories regarding the development of chronic disease are discussed as well as specific mechanisms for individual disease development (pathology, biology, social, economic, political). The burden of specific diseases (prevalence, incidence, distribution by population characteristics) as well as risk and protective factors are highlighted along with preventive strategies.

MPHP654 Grant Writing in Public Health
3 Credit Hours; period offered: periodically
Prerequisites: Students should have taken at least one prior course in Research Methods, Program Evaluation, or Statistics (e.g. MPHP602, MPHP657, MPHP660, MPHP661, or equivalent), or obtain instructor approval before enrolling.
This course is a hands-on course in how to prepare large research and program grant proposals. The course covers related topical areas, with an emphasis upon research and evaluation methods, grant administration, funding source identification and relationship building, literature review, IRB and other regulatory issues, peer review and funding decisions, and research "culture." The main work product is the draft of a major proposal, including a background section and literature review, a detailed description of program or intervention, methods, and a budget and justification.

MPHP658 Economics for Public Health Practitioner
3 Credit Hours; period offered: periodically
Prerequisites: None
This course is an introductory health economics course aimed at public health practitioners. Prior economics coursework is not required. The course will provide the student with a broad foundation in the flow of funds through the health care system, the demand and supply of health care, provider remuneration, financing of health services, managed care, health care spending and global comparisons of health care expenditures. The class will provide an understanding of the concepts and practical applications of cost-benefit and cost-effectiveness analyses. Economic concepts will be examined through public health examples.

MPHP688 Principles of GIS for Public Health
3 Credit Hours; period offered: periodically
Prerequisite: MPHP602. Access to a PC with Windows OS and ArcGIS software. ArcGIS software does not run on a MacIntosh operating system!
This course is designed to introduce the basic principles and methods of GIS and enable the student to apply these skills and knowledge to investigate public health problems. It is a time-sensitive hybrid course that incorporates independent study using on-line modules and in-class discussions of GIS-related articles from the literature. The final project is designed to integrate and apply skills learned throughout the semester and includes presentations of methods and findings in a variety of formats.

MPHP697 MPH Independent Study
1-3 Credit Hours
Prerequisites: None
This elective is intended to offer students an opportunity to gain research or experiential learning outside the classroom in an area of interest where no formal course work is available or in an area where they have already completed one or more formal courses. There is no set curriculum; however, each student elective must be approved by the student's advisor and the Chair of the Upstate MPH Curriculum Committee prior to enrollment. Students must submit a proposal for their planned project/research project outlining site of planned project, supervisor, subject matter to be studied, possible product to be produced (paper, presentation, etc.) and timeline.

Public Health General Education Electives

MPHP/PHGE632: Leadership and Lean Thinking in Healthcare Organizations
3 Credit Hours; period offered: spring
Prerequisites: All students must have actual knowledge of and access to patient care systems associated with responsibilities/ duties as individual healthcare practitioners, Attending physicians, Residents, Medical and other Allied Healthcare Students, and Administrative/ Operational positions. Such familiarity with Systems (both Patient Care and Operational Systems) will be needed in order to participate in class discussions and to complete class activities and assignment.
The intent of this course will be to provide students with the opportunity to explore and develop a leadership approach toward building/improving and sustaining an effective healthcare organization. Students will apply concepts from Public Health and Lean Thinking toward systems re-design for quality patient care outcomes, patient satisfaction, employee engagement, and organizational efficiency in a healthcare setting.

The Rural Medical Scholars Program (RMSP)/previously RMED

https://www.upstate.edu/fmed/education/rmed/

The University has been providing rural training opportunities since the 1960s and remains committed to supporting educational pathways to support rural practice. This program is an evolution and expansion of the Rural Medical Education (RMED) Program which was established in 1989. The Rural Medical Scholars Program (RMSP) was created in 2007 to actively identify, recruit and nurture those interested in future rural practice. The Office of Admissions seeks applicants who may have an interest in practicing in small town or rural settings and provides a holistic review of their applications for the College of Medicine. Interested applicants apply by selecting the Rural Medicine Supplemental option on Upstate's secondary application.

RMSP is not a clinical track program but does offer four years of elective training in rural health. Once admitted into the College of Medicine, RMSP students are automatically enrolled in the preclinical course, Introduction to Rural Health (FAMP1646). RMSP students may continue participating in rural medicine electives and receive a microcredential in Rural Medicine. To be eligible for the microcredential students must complete four rural medicine courses and a signature Capstone project. Those students not admitted through RMSP are welcome to join upon approval from the Program Director.

FAMP1646 Introduction to Rural Health
1.5 Credits
Prerequisites: None
This course is required for all first year medical students admitted to SUNY Upstate College of Medicine through the Rural Medical Scholars Program. The course introduces basic principles related to comprehensive rural health care. The format of the course is interactive, allowing students to learn about their roles as future physicians, and pass on enthusiasm for rural practice to a new generation of future small-town practitioners. Students will be exposed to specific rural health issues through small group case discussions and learn about different rural communities across NYS.

Rural medicine electives include:

FAMP1651 Rural Research Immersion
1.5 Credits
Prerequisite: FAMP1646
This course involves either group or individual student research on issues relevant to rural health. Students will conduct research for up to 15 weeks in the spring semester and early summer. The course culminates with 2-3 days in the summer, on-site in a rural community to allow primary data collection or in-person consultation with providers/administrators. The on-site work will include a presentation to relevant stakeholders in the community. Projects may be done in conjunction with healthcare centers (FQHC) to aid with grant writing, quality improvement projects, etc.

FAMP1650 Rural Medical Education Program
4 Credits
Prerequisites: None
Students live and train in small town host communities. An emphasis is placed on the continuous and comprehensive care of patients. Students develop skills in the diagnosis and management of a wide range of common ambulatory and secondary hospital problems of patients across the age spectrum. Students participate in office hours and conduct inpatient rounds, laboratory work, night call, and case presentations with small town, community based attendings. Students taking this elective must also complete the core clinical rotation, Family Medicine, in the host community. Students negotiate their clinical sites with the Program Director. Students with academic deficiencies or professionalism concerns cannot participate in this course.

FAMP1652 Rural Medicine Community Health Acting Internship
4 Credits
Prerequisites: None
The goal of this community based Acting Internship is to prepare the 4th year medical student to assume the role of a first year resident in caring for patients across the lifespan in an ambulatory Family Medicine Clinic, managing acute and chronic conditions, as well as providing wellness and prevention care. The Acting Internship will provide training and experience in the key components of outpatient primary care.

FAMP1654 Rural Medicine Curriculum Design
1 Credit
Prerequisites: None
This elective is offered to second and fourth year students interested in medical education and teaching. Students assist the Program Director in creating curriculum for rural medicine sessions and community outreach activities involving high school students. Design partners identify session topics, recruit speakers, facilitate case discussions, and develop learning activities for high school learners. Some design partners may take part in medical education research opportunities.

FAMP1657 Rural Medicine Clinical Training Through Journey Mapping
2 Credits
Prerequisites: None
For this elective second year medical students delve into patient care through interactions with their patient educator and community preceptor. A small town physician team, alongside a fourth year medical student, are matched with small groups of second year students. Through guided sessions from August to December, medical students come to know their patient and the patient's condition. Students practice skills related to patient interviewing, notetaking, case review and discussion, physical exam, and presentation.

FAMP1658 Rural Medicine to Basic Sciences through Journey Mapping and Teaching
2 credits
Prerequisites: None
For this elective fourth year medical students are paired with community physician patient teams to delve deeply into the anatomy and physiology of their patient's condition, using their basic science knowledge and research skills. Students are to teach their second year students how the disease progression impacts the patient, focusing on the pertinent science units from first and second year.

College of Nursing

CIP Code: 51.1601

The College of Nursing at SUNY Upstate Medical University is the only nursing program in the region that is part of an academic medical university. It began offering bachelor's and master's degrees in 1984 and currently offers advanced education programs for RNs. Nurses who achieve the advanced degrees offered by the college will be able to practice in a variety of health care settings including ambulatory, home, and long-term care. Graduates of these programs will be tomorrow's leaders in nursing. The programs in nursing are fully accredited by the Commission on Collegiate Nursing Education of the American Association of Colleges of Nursing (AACN).

The Nursing Curriculum is ever evolving to meet the needs of students and to address the health of patients and populations. The programs of study and required courses outlined may be modified subsequent to publication of the Academic Catalog.

Bachelor of Science Degree Online

https://www.upstate.edu/con/programs/bachelor-of-science/index.php

This flexible, online, upper division, baccalaureate degree program is for licensed registered nurses (RNs) with an associate degree or diploma in nursing. Our program focuses on theory and application, in the development of critical thinking and clinical reasoning. The program provides an integration of new and prior knowledge to the practicing nurse in the delivery of comprehensive, quality care to patients and populations of all ages in a variety of settings. While developing the competencies and capabilities of life-long learners, it provides a base for continued graduate education. Students are encouraged to pace their program of study to meet their needs and those of their nursing practices. Degree requirements must be completed within five years of matriculation. The two-year accelerated 16-month program of study lists the courses required to meet graduation requirements. The program is also offered in a 22-month pathway. This program is offered with a Fall and Spring start.

16-month Accelerated Program

Semester One	**Credits**
PATH360 Pathology	3
NURS327 Professional Nursing Transitions	3
NURS330 Health Assessment and Health Promotion Across the Lifespan	4
Liberal Arts Elective (8-week term 1)	3
Liberal Arts Elective (8-week term 2)	3
Semester Total	**16**
Semester Two	**Credits**
ENGL325 Professional and Technical Writing	3
NURS387 Health Care Policy and Politics	3
NURS465 Nurse as Educator for the BS	3
NURS481 Research in Nursing	3
NURS415 Leadership and Management in Nursing	3
BIOL310 Biostatistics	3
Semester Total	**18**
Semester Three	**Credits**
HUMA420 Ethics and the Health Professions	3
NURS444 Community Health Nursing	4
NPMH390 Applied Pharmacology	3
Semester Total	**10**
Semester Four	**Credits**
NURS490 Trends in Practice and Healthcare	5
BIOL420 Epidemiology	3
Liberal Arts Elective	3
NURS456 Informatics, Quality and Safety	3
NURS416 Social Justice in Nursing	3
Semester Total	**17**
Total Credits	**61**

22-Month Accelerated Program

Semester One	**Credits**
PATH360 Pathology	3
NURS327 Professional Nursing Transitions	3
NURS330 Health Assessment and Health Promotion Across the Lifespan	4
Semester Total	**10**
Semester Two	**Credits**
ENGL325 Professional and Technical Writing	3
NURS465 Nurse as Educator for the BS	3
NURS481 Research in Nursing	3
NURS310 Biostatistics	3
Semester Total	**12**
Semester Three	**Credits**
NURS444 Community Health Nursing	4
NPMH390 Applied Pharmacology	3
Semester Total	**7**
Semester Four	**Credits**
NURS490 Trends in Practice and Healthcare	5
BIOL420 Epidemiology	3
NURS456 Informatics, Quality and Safety	3
NURS416 Social Justice in Nursing	3
Semester Total	**14**
Semester Five	**Credits**
Liberal Arts Elective	3
NURS387 Health Care Policy and Politics	3
Liberal Arts Elective	3
NURS415 Leadership and Management in Nursing	3
Semester Total	**12**
Semester Six	**Credits**
HUMA420 Ethics and the Health Professions	3
Liberal Arts Elective	3
Semester Total	**6**
Total Credits	**61**

Total Credits = 61 | Nursing = 31 credits | Arts & Science = 30 credits

Prerequisite

NURS490 requires NURS481

Master of Science Degree

https://www.upstate.edu/con/programs/masters-of-science/index.php

The Master of Science degree program educates Registered Nurses with Bachelor's degrees to work as Nurse Practitioners. The program also prepares nurses for roles in leadership, consulting, education, and research. Students studying to become nurse practitioners choose from four tracks: family, family psychiatric mental health, pediatric and adult geriatric.

The master's program builds on students' undergraduate nursing education and focuses on applying advanced theory and evidence-based data to clinical practice. The curriculum includes courses in the advanced practice role, nursing theory, family theory, informatics, quality and safety, leadership and health care policy, research and advanced pathophysiology and pharmacology. Students take practicum courses as electives to strengthen advanced practice skills. Students also may participate in faculty-sponsored research or individual research projects under faculty guidance, or practice teaching.

At this time, the College of Nursing is only offering the MS in AGNP, FNP, and FPMHNP.

MS Curriculum: Adult Geriatric Nurse Practitioner (AGNP-PC)

https://www.upstate.edu/con/programs/masters-of-science/program-of-study/ms-agnp-program.php

This program lists the courses required to meet graduation requirements. It is offered with a Fall and Spring start.

For students entering prior to 2024:

Spring Start

Semester One	Credits
NURS607 Advanced Health Assessment	3
NURS612 Family Nursing Theory	3
NURS616 Advanced Nursing Research	3
NURS621 Clinical Pathophysiology	3
Semester Total	**12**
Semester Two	**Credits**
NURS613 Innovation in Information, Quality & Safety	3
NURS640 Pharmacology for Advanced Practice	3
NURS656 Clinical Management -AGNP-PC I	5
Semester Total	**11**
Semester Three	**Credits**
NURS565 Nurse as Educator	3
NURS626 Leadership for the Advanced Practice Nurse	3
NURS657 Clinical Management AGNP-PC-II	6
Graduate Elective	3
Semester Total	**15**
Semester Four	**Credits**
NURS610 Nursing Theory	3
NURS658 Clinical Management AGNP-PC-III	6
Graduate Elective	3
Culminating Graduate Project	0
Semester Total	**12**
Total Credits	**50**

Prerequisites

NURS640 requires NURS621
NURS656 requires NURS607 and NURS616
NURS657 requires NURS656
NURS658 requires NURS657

Corequisites

NURS607 requires NURS621
NURS656 requires NURS640
NURS656 requires NURS612 and NURS565

For students entering 2024 and forward:

Fall Start

Semester One	Credits
NURS540 Health Promotion and Education	3
NURS530 Professional Role Development I: The Advanced Practice Role	3
Graduate Elective	3
NURS508/621 Clinical Pathophysiology	3
Semester Total	**12**
Semester Two	**Credits**
NURS531 Professional Role Development II: Applying EBP	3
NURS640 Pharmacology for Advanced Practice	3
NURS507/607 Advanced Health Assessment	3
Semester Total	**9**
Semester Three	**Credits**
NURS532 Professional Role Development III: Concepts in Informatics, Quality and Safety	3
NURS656 Clinical Management AGNP 1 (150 hours)	5
NURS696 Dx and Clinical Procedures (term A) (Elective)	3
Semester Total	**11**
Semester Four	**Credits**
NURS680 Leadership for the Advanced	3
NURS657 Clinical Management AGNP 2 (225 hours)	6
Begin Culminating Graduate Project	0
Semester Total	**9**
Semester Five	**Credits**
NURS658 Clinical Management AGNP 3 (225 hours)	**6**
NURS605 Public Health Policy	**3**
Culminating Graduate Project	**0**
Semester Total	**9**
Total Credits	**50**

Prerequisites

NURS531 requires NURS530
NURS532 requires NURS531
NURS680 requires NURS532
NURS640 requires NURS508/621
NURS656 requires NURS507/607, NURS508/621 and NURS640
NURS657 requires NURS656
NURS658 requires NURS657

MS Curriculum: Family Nurse Practitioner (FNP)

https://www.upstate.edu/con/programs/masters-of-science/curriculum/ms-fnp-curriculum.php

This program of study lists the courses required to meet graduation requirements.

Full Time 2-year Program

Fall 1	**Credits**
NURS530 Professional Role Development I: The Advanced Practice Role	3
NURS508/621 – Clinical Pathophysiology	3
Semester total	**6**
Spring 1	**Credits**
NURS640 Pharmacology for Advanced Practice	3
NURS531 Professional Role Development II: EBP	3
NURS506/607 Advanced Health Assessment	3
Semester Total	**9**
Summer 1	
NURS609 FPMHNP Theory, **Term A**	3
NURS696 Dx and Clinical Procedures, **Term A**	3
Semester Total	**6**
Fall 2	
NURS641/627 Clinical Management NP I, (250 hours)	8
Semester Total	**8**
Spring 2	
NURS642/628 Clinical Management NP II (250 hours)	8
NURS605 Public Health Policy	3
Semester Total	**11**
Summer 2	
NURS540 Health Promotion and Education	3
NURS532 Professional Role Development III: Concepts in Informatics, Quality and Safety	3
Semester Total	**6**
Fall 3	
NURS643/629 Clinical Management NP III (250 hours)	8
NURS680 Professional Role Development IV: Ethics and Advanced Leadership	3
NURS710 Foundations of the DNP Project (50 project hours)	3
Semester Total	**14**
Total Credits	**60**

Prerequisites

NURS531 requires NURS530
NURS532 requires NURS531
NURS680 requires NURS532
NURS640 requires NURS508/621
NURS641/627 requires NURS507/607, NURS508/621, and NURS640
NURS642/628 requires NURS641/627
NURS643/629 requires NURS642/628

MS Curriculum: Family Psychiatric Nurse Practitioner (FPMHNP)

https://www.upstate.edu/con/programs/masters-of-science/program-of-study/ms-fpmhnp-program.php

This program of study lists the courses required to meet graduation requirements.

Full time 2-year Program

Fall 1	**Credits**
NURS530 Professional Role Development I: The Advanced Practice Role	3
NURS508/621 – Clinical Pathophysiology	3
Semester total	**6**
Spring 1	**Credits**
NURS640 Pharmacology for Advanced Practice	3
NURS531 Professional Role Development II: EBP	3
NURS506/607 Advanced Health Assessment	3
Semester Total	**9**
Summer 1	
NURS638 Mental Health Across the Lifespan, **Term A**	3
NURS609 FPMHNP Theory, **Term A**	3
Semester Total	**6**
Fall 2	
NURS641/627 Clinical Management NP I, (250 hours)	8
Semester Total	**8**
Spring 2	
NURS642/628 Clinical Management NP II (250 hours)	8
NURS605 Public Health Policy	3
Semester Total	**11**
Summer 2	
NURS540 Health Promotion and Education	3
NURS532 Professional Role Development III: Concepts in Informatics, Quality and Safety	3
Semester Total	**6**
Fall 3	
NURS643/629 Clinical Management NP III (250 hours)	8
NURS680 Professional Role Development IV: Ethics and Advanced Leadership	3
NURS710 Foundations of the DNP Project (50 project hours)	3
Semester Total	**14**
Total Credits	**60**

Prerequisites

NURS531 requires NURS530
NURS532 requires NURS531
NURS680 requires NURS532
NURS640 requires NURS508/621
NURS641/627 requires NURS507/607, NURS508/621, and NURS640
NURS642/628 requires NURS641/627
NURS643/629 requires NURS642/628

Post Graduate Certificates

https://www.upstate.edu/con/programs/post-masters-certificate/index.php

Family Nurse Practitioner (FNP), Family Psych Mental Health Nurse Practitioner (FPMHNP), Pediatric Nurse Practitioner (PNP), Adult Geriatric Nurse Practitioner (AGNP-PC)

The Nurse Practitioner Post Graduate Program is open to nationally certified Advanced Practice Registered Nurses (APRN) with a clinical master's degree seeking certification as Nurse Practitioner in an additional population specialty. Transfer courses and clinical hours will be evaluated on an individual basis. Term start will be determined upon application through a GAP analysis process.

For students entering prior to 2024:

Semester One	**Credits**
NURS508/621 Clinical Pathophysiology	3
NURS507/607 Advanced Health Assessment	3
NURS638 Mental Health Across The Lifespan (FPMHNP only)	3
NURS609 Family Psychiatric and Mental Health Theory (FPMHNP only)	3
Semester Total	**6 (12)**
Semester Two	**Credits**
NURS640 Pharmacology for Advanced Practice	3
NURS612 Family Nursing Theory	3
NURS641/686/627/656 Clinical Management I	8
Semester Total	**14**
Semester Three	**Credits**
NURS642/687/628/657 Clinical Management II	8
Semester Total	**8**
Semester Four	
NURS613 Innovation in Information, Quality and Safety	3
NURS651 Genetics and Genomics	2
Semester Total	**5**
Semester Five	**Credits**
NURS643/688/629/658 Clinical Management III	8
Semester Total	**8**
Total Credits	**41 (47)**

Prerequisites

FNP

NURS640 requires NURS5621
NURS641 requires NURS5607
NURS642 requires NURS641
NURS643 requires NURS642

FPMHNP

NURS640 requires NURS621
NURS627 requires NURS607
NURS628 requires NURS627
NURS629 requires NURS628

PNP

NURS640 requires NURS621
NURS686 requires NURS607
NURS687 requires NURS686
NURS688 requires NURS687

For students entering 2024 and forward:

Semester One	**Credits**
NURS508/621 Clinical Pathophysiology	3
NURS612 Family Nursing Theory or NURS530 Professional Role Development I: The Advanced Practice Role	3
NURS638 Mental Health Across the Lifespan (*FPMHNP Only*) (Term A)	3
NURS609 FPMHNP Theory and Psychopharmacology (*FPMHNP Only*) (Term A)	3
Semester Total	**6 (12)**
Semester Two	**Credits**
NURS507/607 Advanced Health Assessment	3
NURS640 Pharmacology for Advanced Practice	3
NURS613 Innovation in Information, Quality and Safety or NURS532 Professional Role Development III: Concepts in Informatics, Quality and Safety	3
NURS696 Dx and Clinical Procedures (FNP, PNP, AGNP track only) (Term A)	3
Semester Total	**12 (9)**
Semester Three	**Credits**
NURS627/641/656/686 Clinical Management FPMHNP/FNP/PNP/AGNP 1 (250 hours)	8
Semester Total	**8**
Semester Four	
NURS628/642/657/687 Clinical Management FPMHNP/FNP/PNP/AGNP 2 (250 hours)	**8**
Semester Total	**8**
Semester Five	**Credits**
NURS629/643/658/688 Clinical Management FPMHNP/FNP/PNP/AGNP 3 (250 hours)	**8**
Semester Total	**8**
Total Credits	**42 (45)**

Prerequisites

FNP

NURS640 requires NURS508
NURS641 requires NURS507
NURS642 requires NURS641
NURS643 requires NURS642

FPMHNP

NURS640 requires NURS508
NURS627 requires NURS507, NURS638 and NURS609
NURS628 requires NURS627
NURS629 requires NURS628

PNP

NURS640 requires NURS508
NURS686 requires NURS507
NURS687 requires NURS686
NURS688 requires NURS687

AGNP

NURS640 requires NURS508
NURS656 requires NURS507
NURS657 requires NURS656
NURS658 requires NURS657

Bachelor of Science to Doctor of Nursing Practice (BS-DNP)

https://www.upstate.edu/con/programs/bs-doctor-nursing-practice/index.php

The Bachelor of Science to Doctor of Nursing Practice (DNP) Program at Upstate Medical University College of Nursing is specifically for nurses seeking to develop their clinical skills and versatility. The skills of Nurse Practitioners (DNPs) make them essential resources in many different settings. DNPs can choose a variety of workplace options, depending on their scope of practice and populations served. This program is offered with a fall full-time option and a spring part-time option.

For students entering in 2022 and 2023:

BS-DNP Curriculum-Family Nurse Practitioner (FNP), Pediatric Nurse Practitioner (PNP) Mental Health Nurse Practitioner (FPMHNP)

https://www.upstate.edu/con/programs/bs-doctor-nursing-practice/program-of-study/bs-dnp-fnp-program.php

https://www.upstate.edu/con/programs/bs-doctor-nursing-practice/program-of-study/bs-dnp-pnp-program.php

https://www.upstate.edu/con/programs/bs-doctor-nursing-practice/program-of-study/bs-dnp-fpmhnp-program.php

This program of study lists the courses required to meet graduation requirements.

Fall Start

Semester One	**Credits**
NURS565 Nurse as Educator	3
NURS621 Clinical Pathophysiology	3
NURS626 Leadership for the Advanced Practice Nurse	3
NURS637 Scholarly Writing and Program Development	3
Semester Total	**12**
Semester Two	**Credits**
NURS607 Advanced Health Assessment	3
NURS612 Family Nursing Theory	3
NURS616 Advanced Nursing Research	3
NURS640 Pharmacology for Advanced Practice	3
Semester Total	**12**
Semester Three	**Credits**
NURS608 Epidemiology and Population Health	3
NURS613 Innovation in Information, Quality and Safety	3
NURS638 Mental Health Across the Lifespan (FPMHNP track only)	3
Semester Total	**6 (9)**
Semester Four	**Credits**
NURS632 Statistics and Methods for the DNP Project	4
NURS627/641/686: Clinical Management/ I	6
NURS710 Foundations of the DNP Project NURS609 Family Psychiatric Mental Health Theory (FPMHNP track only)	3 3
Semester Total	**13 (16)**
Semester Five	**Credits**
NURS610 Nursing Theory	3
NURS620 Legal and Ethical Issues	3
NURS628/642/687 Clinical Management II	6
NURS722 DNP Project I	3
Semester Total	**15**
Semester Six	**Credits**
NURS713 Advancements in Information, Quality and Safety	3
NURS723 DNP Project II	2
Semester Total	**5**
Semester Seven	**Credits**
NURS629/643/688 Clinical Management III (225 hours)	6
NURS711 Organization Behavior and Systems Leadership	3
NURS725 DNP Project III	4
Semester Total	**13**
Semester Eight	**Credits**
NURS605 Public Health Policy	3
NURS669 Clinical Immersion	5
NURS730 Project Defense	1
Semester Total	**9**
Total Credits	**85 (91)**

Prerequisites

NURS607 requires NURS621
NURS627/641/686 requires NURS607
NURS628/642/687 requires NURS627/641/686
NURS629/643/688 requires NURS628/642/687
NURS640 requires NURS621
NURS686 requires NURS616 and NURS640
NURS710 requires NURS608
NURS722 requires NURS710
NURS723 requires NURS722
NURS725 requires NURS723

For students entering 2024 and forward:

BS-DNP Curriculum-Family Nurse Practitioner (FNP), Pediatric Nurse Practitioner (PNP), Mental Health Nurse Practitioner (FPMHNP) *(Effective Summer 2024)*

This is a revised summer start curriculum effective Summer 2024. This program is offered with a summer start both full-time and part-time options.

The Bachelor of Science to Doctor of Nursing Practice (DNP) Program at Upstate Medical University College of Nursing is specifically for nurses seeking to develop their clinical skills and versatility. This program of study lists the courses required to meet graduation requirements.

Summer Start

Semester One	Credits
NURS530 Professional Role Development I: The Advanced Practice Role	3
NURS540 Health Promotion and Education	3
NURS638 Mental Health Across the Lifespan *FPMHNP track only* **(A Term)**	3
Semester Total	**6 (9)**
Semester Two	**Credits**
NURS508/621 Clinical Pathophysiology	3
NURS632 Statistics and Methods for the DNP Project	4
NURS541 Research Utilization	2
Semester Total	**9**
Semester Three	**Credits**
NURS507/607 Advanced Health Assessment	3
NURS640 Pharmacology for Advanced Practice	3
NURS531 Professional Role Development II-Applying EBP	3
NURS605 Public Health Policy	3
Semester Total	**12**
Semester Four	**Credits**
NURS608 Epidemiology and Population Health	3
NURS532 Professional Role Development III: Concepts in Informatics, Quality and Safety	3
NURS696 Diagnostic and Clinical Procedures (FNP,PNP,AGNP only)	3
NURS609 FPMHNP Theory and Psychopharmacology (FPMHNP track only) (Term A)	3
Semester Total	**9 (12)**
Semester Five	**Credits**
NURS710 Foundations of DNP Project (*50 project hours*)	3
NURS627/641/686/656 Clinical Management I *(250 hours)*	8
Semester Total	**11**
Semester Six	**Credits**
NURS722 DNP Project I (50 hours)	3
NURS628/642/687/657 Clinical Management II (*250 hours*)	8
Semester Total	**11**
Semester Seven	**Credits**
NURS723 DNP Project II *(50 hours*)	2
NURS509 Genetics/Genomics	3
NURS680 Professional Role Development IV: Ethics and Advanced Leadership	3
Semester Total	**8**
Semester Eight	**Credits**
NURS725 DNP Project III (50 hours)	3
NURS629/643/688/658 Clinical Management III (*250 hours*)	8
Semester Total	**11**
Semester Nine	**Credits**
NURS730 Project Defense	1
NURS630/644/659/689 Clinical Management IV (*250 hours*)	6
NURS637 Scholarly Writing and Program Development	3
Semester Total	**10**
Total Credits	**87 (90)**

Prerequisites

NURS531 requires NURS530
NURS532 requires NURS531
NURS680 requires NURS532
NURS640 requires NURS508
NURS627/641/656/686 requires NURS507, NURS 508 and NURS 640
NURS627 requires NURS638 and NURS609
NURS628 requires NURS627
NURS642 requires NURS641
NURS657 requires NURS 656
NURS687 requires NURS686
NURS629 requires NURS628
NURS643 requires NURS642
NURS658 requires NURS657
NURS688 requires NURS687
NURS630 requires NURS629
NURS644 requires NURS643
NURS659 requires NURS658
NURS689 requires NURS688
NURS710 requires NURS632
NURS722 requires NURS710
NURS723 requires NURS722
NURS725 requires NURS723
NURS730 requires NURS725

Doctor of Nursing Practice (DNP)

https://www.upstate.edu/con/programs/doctor-nursing-practice/index.php

The **on-line**, **part-time** DNP doctoral program is specifically for the master's prepared Nurse Practitioner (NP) or Clinical Nurse Specialist (CNS). This terminal degree provides skills in translation and generation of evidence-based knowledge and expanded skills in leadership, health policy and advocacy, inter-professional practice, and information technology. DNP clinical practice outcomes promote safe, effective, and equitable patient care at the population and system levels, as well as for individual patients.

The part-time post graduate DNP degree consists of 40 semester hours, which are completed in seven semesters (approximately 6 credits per semester) and two summer semesters (3 credits per semester) or two and a half years. The Doctor of Nursing Practice program is designed to meet the American Association of Colleges of Nursing (AACN) Essentials of Doctoral Education for Advanced Nursing Practice. This program of study lists the courses the student will be required to complete to meet graduation requirements. This program has a Fall, Spring and Summer Start.

Fall Start

Semester One	Credits
NURS632 Statistics and Methods for the DNP Project	4
Semester Total	**4**
Semester Two	**Credits**
NURS711 Organizational Behavior and Systems Leadership	3
NURS620 Legal & Ethical Issues	3
Semester Total	**6**
Semester Three	**Credits**
NURS608 Epidemiology and Population Health	3
NURS713 Advancements in Information, Quality and Safety	3
Semester Total	**6**
Semester Four	**Credits**
Elective	3
NURS710 Foundations of the DNP Project (75 hours)	3
Semester Total	**6**
Semester Five	**Credits**
NURS605 Public Health Policy	3
NURS722 DNP Project I (150 hours)	3
Semester Total	**6**

Semester Six	**Credits**
NURS723 DNP Project II (150 hours)	3
NURS651 Genetics and Genomics for the APRN	2
Semester Total	**5**
Semester Seven	**Credits**
NURS725 DNP Project III (150 hours)	3
Semester Total	**3**
Semester Eight	**Credits**
NURS730 Project Defense	1
NURS637 Scholarly Writing and Program Development	3
Semester Total	**4**
Total Credits	**40**

Prerequisites

NURS710 requires NURS632 and NURS608
NURS722 requires NURS710
NURS723 requires NURS722
NURS725 requires NURS723

Nursing Course Descriptions

Note: For electives that may be available in any of the programs, please contact your program director.

Bachelor of Science Online

https://www.upstate.edu/con/programs/bachelor-of-science/index.php

HUMA420 Ethics, & Health Professions
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the integration of the principles and application of ethical decision making in professional practice within healthcare and the communities served by nursing and other health care professionals. Areas of study will include: a working knowledge of the philosophical principles guiding ethics and codes of ethical practice; the knowledge and skill development needed in identifying the morals, values and beliefs of the individual patient/client and family/community; integration of tools and processes essential for providing culturally competent and ethically based reflective health care. There is a specific emphasis on current ethical dilemmas, bioethics, legal issues and responsibilities in health care, and the inter-professional collaboration of the health care team.

NURS327 Professional Nursing Transitions
3 Credit Hours
Prerequisites: None
Corequisites: None
The impact of nursing's role in health care is described through both nursing research and nursing leaders. The scope of professional nursing practice is explored from an evolutionary perspective. The mission and philosophy of the College of Nursing and the *Baccalaureate Essentials* are discussed and applied to nursing practice. Emphasis is on the role and impact of the baccalaureate prepared Registered Nurse within the inter-professional health care team and the development of effective critical thinking and communication skills. Principles of clinical judgment and reflection will be introduced. Professional growth and lifelong learning are highlighted as essential attributes of a registered nurse.

NURS330 Health Assessment and Health Promotion Across the Lifespan
4 Credit Hours
Prerequisites: None
Corequisites: None
This course is aimed at broadening the student's knowledge in health assessment and health promotion of the individual across the lifespan. Family, cultural, and sociological aspects that influence an individual's health are explored. Communication techniques for obtaining a comprehensive health history are practiced. Risk factors are identified based on a comprehensive health history, including environmental and genomic influences on health, to develop patient specific risk reduction strategies. Focus is on the performance of a systematic, comprehensive health assessment, the critical analysis of assessment data, and health promotion. Health promotion and disease prevention, risk reduction, and strategies are integrated into assessment and discussion with patient and family. Students will explore models of health promotion and challenges to creating a healthy society. Strategies incorporating principles of clinical judgement to assist in achieving and maintaining wellness and optimal quality of life are emphasized.

NPMH390 Applied Pharmacology
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the essential principles of applied pharmacology. Students will integrate core concepts of pharmacology, physiology, and psychology to understand the clinical application of commonly used medications. The concept of polypharmacy in relation to therapeutic and adverse effects, and dosing principles will be critically analyzed. The course examines pharmacology with a focus on major areas of therapeutic drug use to include cardiovascular, respiratory, renal, central nervous system/psych, infectious diseases, endocrine, reproductive, gastrointestinal, musculoskeletal, and oncology. Non-pharmacologic and alternative therapies for symptom management are part of the comprehensive health assessment and the nursing care plan.

NURS387 Health Care Policy and Politics
3 Credit Hours
Prerequisites: None
Corequisites: None
The focus of this course is on the role of the professional nurse as a participant in the political process in the practice setting and in the broader public sector. Particular attention is given to the development of public policy related to health care. Consideration is given to historic, sociologic, technologic, economic, legal, and political factors which influence health care delivery. Attention also is given to the local, state, and federal systems for financing and delivering health care with consideration of the issues of access and distribution of services. Analysis of the political action process is used to operationalize the concept of the nurse as an agent of change, client advocate, and participant in decision-making related to health policy. Opportunity is provided for the student to study a

political issue and to contact appropriate legislative representatives to discuss his/her position on current legislation related to the issue.

NURS415 Leadership and Management in Nursing
3 Credit Hours
Prerequisites: None
Corequisites: None
This course introduces the student to the symbiotic components of nursing management and leadership. An overview of management and leadership theories are examined reflecting the interdependent relationship between the two. Emphasis is placed on the functions of the management process, planning, organizing, staffing, directing, and controlling, as it relates to the role of a nurse manager. Effective communication skills are discussed to facilitate group cohesion and team building.

NURS416 Social Justice in Nursing
3 Credit Hours
Prerequisites: None
Corequisites: None
This course synthesizes nursing theory, history, practice, education, and activism in an exploration of the construct of "social justice" in nursing. Students in this course will gain an appreciation for the opportunities for the nursing profession to fulfill its potential as a force for socially and structurally just work, as well as the barriers to fulfilling this potential. This course will provide the resources and tools for baccalaureate nurses to use their nursing roles to challenge systems that reinforce health inequities, in order to improve care for patients and communities.

NURS444 Community Health Nursing
4 Credit Hours
Prerequisites: None
Corequisites: None
Using an open systems framework, this course focuses on the theory and practice of community health nursing. Community health nursing is a blend of two components: public health science with its roots in epidemiology, and the art and science of nursing. While students may work with individuals and families, emphasis is on population-focused nursing with application to *Healthy People* to promote healthy communities. Students assess a community to identify a priority health need or risk and apply evidence-based interventions at the three levels of prevention. Application of the nursing process is used to address the specific needs identified in aggregates in the community. Using available community resources, students develop advanced communication skills in collaborating with the healthcare team to plan, implement, and evaluate interventions to improve the overall health of communities.

NURS456 Informatics, Quality & Safety
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the skills and knowledge needed to promote quality, maintain patient safety, and information across healthcare settings. The course combines evidence-based concepts from technology, information science, communication studies, patient safety, organizational quality, and health care science to prepare nurses to participate in the process of improving health care quality and safety. Content explores current and potential uses for technology in transforming health care. Emphasis is on retrieving and interpreting information to promote positive patient outcomes.

NURS465 Nurse as Educator for the BS
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the baccalaureate nurse as an educator of patients, families, and patient populations. Theories, teaching strategies, and development of teaching plans and their evaluation of their efficacy will be examined. Cultural competence, health literacy, and health promotion will be integrated into the course. Students will assess learner characteristics and readiness for learning and evaluate application. The evaluation of electronic websites will be addressed and also, technology as a tool for learning and teaching. The course provides the framework to utilize research theory and evidence-based practice in teaching and learning. The ethical, economic, social, and political impact on the professional nurse's role of educating their patients, families, and patient populations will be covered.

NURS481 Research in Nursing
3 Credit Hours
Prerequisites: None
Corequisites: None
Research in Nursing addresses critical inquiry in the development of nursing science. This course is an introduction to the principles of scientific inquiry, including identification of forms of analytical thinking common to problem solving in nursing. Students are guided in the development of critical appraisal skills in the evaluation of both quantitative and qualitative research methodologies and in examining the role of the professional nurse as data collector, designer, producer, replicator, and consumer of research.

NURS490 Trends in Practice and Healthcare
5 Credit Hours
Prerequisites: NURS481
Corequisites: None
This capstone course focuses on the role of the professional nurse in the changing healthcare delivery system. It provides an opportunity for the students to apply and synthesize learning gained in previous course work and experience the care of patients in a variety of settings. There is an emphasis on clinical judgment, reflection on practice, and lifelong learning. Each student will participate in a precepted capstone experience where a clinical project will be completed. Student led seminars and capstone presentations will facilitate the sharing of knowledge obtained from literature and the clinical.

BIOL420 Epidemiology
3 Credit Hours
Prerequisites: None
Corequisites: None
This course will introduce students to the discipline of epidemiology and its application to public health. Epidemiological principles and methods are presented with emphasis on the health status and health needs of a population: on levels of prevention, on susceptibility, communicability, and modes of transmission; and, on promotion of health using various strategies. Statistical measures and findings from research are applied to describe the

incidence and prevalence of disease; morbidity and mortality rates; health beliefs and behaviors; socioeconomic, ethnic, and racial disparities; causality of disease and disability; and risk factors for the purpose of evidence-based decision making in public health. This course is offered by the College of Health Professions.

ENGL325 Professional and Technical Writing
3 Credit Hours
Prerequisites: None
Corequisites: None
This course is founded on the premise that knowing how to use language in various oral and written forms builds skill in research, in reasoning, and in problem solving. Topics include how to create professional written documents such as: memoranda, reports, abstracts, outlines, reviews of professional texts, business letters, resumes and either (depending on program) a formal proposal or scientific research paper. Emphasis is placed on student ability to produce coherent texts using scholarly and/or scientific writing techniques and to demonstrate the ability to revise and improve such texts. This course is offered by the College of Health Professions.

PATH360 Pathology
3 Credit Hours
Prerequisites: None
Corequisites: None
This course covers basis pathologic mechanisms and specific diseases/disorders affecting the major organ systems of the human body. Commonly encountered diseases/disorders will be covered in detail. Pathophysiologic mechanisms and concepts are included, especially for most commonly encountered disease states. Topics such as genetics/heredity, immune system disease, and malignant processes are presented as well. This course is offered by the College of Health Professions.

BIOL310 Biostatistics
3 Credit Hours
Prerequisites: None
Corequisites: None
This is a basic course in statistical concepts designed to enable health science professionals to apply basic descriptive and inferential statistical techniques to problems in their field. The topics discussed include descriptive statistics, elementary probability, normal distribution, hypotheses testing, including t tests, regression and correlation theories; analysis of variance (ANOVA); and chi-squared tests. The use of a computer statistical package will be emphasized.

Master of Science (AGNP-PC)

https://www.upstate.edu/con/programs/masters-of-science/curriculum/index.php

NURS565 Nurse as Educator
3 Credit Hours
Prerequisites: None
Corequisites: None
The focus of this course is on role development of the nurse as an educator. Emphasis is placed on preparing the student to perform effectively as a communicator of information, which will enable the client to act as a responsible partner in his/her own health care. Recognizing teaching as an important clinical skill, this course engages students in formal inquiry into key components of patient education. Students have the opportunity to participate in the processes of assessment, developing, and implementing a patient education session with a specified group of learners. Students analyze web-based and printed educational materials and apply evidence-based findings to promote patient and consumer health seeking behaviors. The impact of health literacy, legal issues, ethical considerations related to patient education is discussed.

NURS507/607 Advanced Health Assessment
3 Credit Hours
Corequisite: NURS621
This is the first course in the clinical advanced practice nurse (APN) series with a focus on advanced physical assessment, enhanced communication skills, and the reinforcement of health promotion and disease prevention across the life span. The course work and clinical lab activities enhance the student's history taking proficiency, physical assessment skills, critical thinking, and decision-making competency essential for planning, delivering, and evaluating health care in the population.

NURS609 Family Psychiatric and Mental Health Theory
3 Credit Hours
Corequisite: NURS607
This course presents the theoretical basis for anatomical, biological, and psychological aspects of advanced practice in psychiatric mental health nursing. Genetic, prenatal, and experienced environmental influences are explored in relation to their role in brain development and functions. Emphasis is placed on neurobiological and psychosocial theories which provide the foundation for current and emerging pharmacological and non-pharmacological interventions. Introduction to theories, concepts, and models relevant to the Family Psychiatric Mental Health Nurse Practitioner's role in the care of individuals with mental illnesses and populations at risk for mental illness are examined.

NURS610 Nursing Theory
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the development of nursing science through the use of nursing theoretical frameworks. Students are guided in the examination of the development of conceptualizations and in the critique of concepts, theories, and boundaries for nursing study, as well as the implications for using theories of nursing and theories in nursing. Emphasis is on critical thinking, via description, analysis, and evaluation of nursing theory for application to practice. The importance of research to the continuing development of nursing theory as a method of building nursing's unique knowledge base is emphasized throughout the course.

NURS612 Family Nursing Theory
3 Credit Hours
Prerequisites: None
Corequisites: None
This course examines the contemporary family's structure, function, and process. Various theoretical frameworks and models are explored and applied to nursing assessment of and intervention with the healthy and high-risk family system in a variety of clinical settings. Students utilize a wellness approach to optimize health within a developmental framework and promote

family resilience and adaptation throughout the life span. Psychosocial, cultural, economic, gender, and spiritual variables and their impact on family life are analyzed.

NURS613 Innovation in Information, Quality and Safety
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the skills and knowledge needed to troubleshoot and analyze problems with the system, promote quality, maintain patient safety, and manage information across healthcare settings. Collaborative and diverse opportunities to bring about improvement in healthcare are evaluated. The course integrates evidence-based concepts from technology, information science, communication studies, patient safety, organizational quality, and health care science preparing nurses to take an active role in transforming healthcare and clinical practice. Emphasis is placed on the nurse's competency in retrieving, interpreting, and sharing information to support an evidence-based clinical practice.

NURS616 Advanced Nursing Research
3 Credit Hours
Prerequisites: None
Corequisites: None
This Masters level course focuses on issues involved in the appraisal and use of research evidence, and in the conduct of research. Identification and analysis of research related to clinical practice and health care outcomes are included. Evaluation processes relevant to nursing practice are addressed. The course will prepare the student to synthesize the results of existing research in an area of interest, to initiate collaboration with others in developing and continuously improving a practice based on research as evidence, and to understand the research expectations for advanced practice nurses. A basic understanding of research terms, the quantitative research process, and statistics is expected of students who enter the course.

NURS508/621 Clinical Pathophysiology
3 Credit Hours
Pre/Corequisites: Matriculated graduate status
This course focuses on the causality of alterations in human physiologic function across the lifespan. Normal physiology and pathological phenomena produced by altered states of health across the lifespan are contrasted. The human physiologic responses to these altered states are related to pertinent diagnostic values, tests, and methods. This course serves as a basis for subsequent courses that deal with the clinical diagnosis and management of health problems.

NURS626 Leadership for the Advanced Practice Nurse
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the skills and knowledge needed by the Advanced Practice Nurse (APN) to function in the role of a leader in health care. Emphasis is placed on the development of individuals as informed and collaborative leaders within the health care system who use current research-based evidence in their roles. Utilizing the nursing process, and leadership theory/organizational theory, students analyze the effectiveness of health care organizations and develop interventions to improve the organizational effectiveness. Issues related to the APN role as an active participant in the legislation of health care policy are explored. This course is designed to offer both theoretical foundations of leadership and application of practical skills for nursing leaders.

NURS627 Clinical Management: Family Psychiatric Mental Health FPMHNP I
5 Credit Hours
Prerequisites: NURS607, NURS621 and NURS609
Corequisites: NURS616, and NURS640
This course provides the foundation for clinical management of children, adolescents, adults, and older adults with common psychiatric mental health problems. A bio-psychosocial framework for understanding the development and treatment of psychiatric disorders and mental health problems is explored. Students are introduced to the process, dynamics, principles, and ethical consideration of advanced practice psychiatric nurse interviewing, assessing, and diagnosing as well as the initial planning, implementation, and evaluation of therapeutic interventions with individuals. Therapies are introduced to promote health and prevent illness for individuals across the lifespan and their families. Psych pharmacotherapeutics and other therapeutic approaches are discussed in relation to their roles in the treatment of mental illness/psychiatric disorders.

NURS628 Clinical Management/FPMHNP II
6 Credit Hours
Prerequisite: NURS627
Corequisites: NURS612 and NURS565
This course focuses on advanced knowledge of psychiatric-mental health nursing, including selected mental health problems and psychiatric disorders. Assessment, decision-making and therapeutic interventions with families, groups, and populations at risk are explored. The role of advanced practice nurses in the implementation of psych pharmacotherapeutic and integrated biopsychosocial educational and supportive interventions for children, adolescents, adults, and older adults as well as culturally diverse populations is examined.

NURS629 Clinical Management/FPMHNP III
6 Credit Hours
Prerequisite: NURS628
This course continues to focus on advanced knowledge of psychiatric mental health nursing, including diagnosis and management of children, adolescents, adults and older adults with mental health problems and psychiatric disorders. Societal, ethical and systems issues that affect the advanced practice psychiatric nursing role during the delivery of primary mental healthcare to specialty populations are explored.

NURS640 Pharmacology for Advanced Practice
3 Credit Hours
Prerequisite: Matriculated graduate status, NURS621
This course provides an integrative approach to pharmacotherapy, utilizing principles of pharmacology, pharmacokinetics, and pharmacodynamics. The characteristics of the major drug classes and clinical practice implications are addressed, as are legal and regulatory implications and essentials of prescribing. The objective of this course is for the student to develop a core of information

that may be practically applied to drug utilization in practice and develop a sound basis for further development of this database.

NURS641 Clinical Management Primary Health Care/FNP I
5 Credit Hours
Prerequisites: NURS607 and NURS621
Corequisites: NURS612, NURS565, NURS616 and NURS640
This is an entry level clinical course in which the students integrate basic knowledge of human anatomy and physiology and build on advanced health assessment knowledge. The student develops an understanding of the pathologic changes and clinical manifestations that characterize common acute and chronic disorders. Students apply new understanding of pathophysiology, evolving clinical decision-making skills to the interpretation of assessment data, the diagnosis of illness and the treatment of primary care across the lifespan. Students perform complete health assessments and provide client care with supervision. Collaborative strategies guide the student in the implementation and evaluation of accepted advanced practice nursing interventions and integrate research, teaching and consultation skills as a beginning basis for clinical practice.

NURS642 Clinical Management Primary Health Care/FNP II
6 Credit Hours
Prerequisites: NURS640 and NURS641
This course reflects a building of knowledge and skills from Clinical Management in Primary Health Care: Family NP I. Students continue to progress in the nurse practitioner role and in the delivery of health care to individuals with acute and chronic health care needs. In collaboration with the health care team, students are involved in the implementation and the evaluation of accepted medical and nursing interventions used in the care of patients across the lifespan. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidenced-based research are integrated along with complementary and alternative healing approaches appropriate for individuals and their families with health care problems. Course work, classroom activities, and clinical assignments enhance students' critical thinking and decision-making skills for complex health care problem evaluation.

NURS643 Clinical Management in Primary Health Care/ FNP III
6 Credit Hours
Prerequisite: NURS642
This is a culminating clinical course in which students are managing client care with increasing independence. The collaborative model guides the student in the implementation and evaluation of accepted medical and nursing interventions used in the care of the patients across the lifespan. Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed in a structured environment that incorporates ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are applied to the advanced practice setting to identify and solve complex problems.

NURS656 Clinical Management for Primary Care Health Care/AGNP-PC-I
5 Credit Hours
Prerequisites: NURS607 and NURS616
Corequisites: NURS640
This is an entry level clinical course in which the students integrate basic knowledge of human anatomy and physiology and build on advanced health assessment knowledge. Students develop an understanding of the pathologic changes and clinical manifestations that characterize common acute and chronic disorders. Students apply a new understanding of pathophysiology, evolving clinical decision-making skills to interpret assessment data, the diagnosis of illness, and young adulthood treatment through old age. Students perform complete health assessments and provide clinical care with supervision. Collaborative strategies guide the student in implementing and evaluating accepted advanced practice nursing interventions and integrating research, teaching and consultation skills as a beginning basis for clinical practice.

NURS657 Clinical Management for Primary Health Care/AGNP-PC-II
6 Credit Hours
Pre/Corequisites: NURS640 and NURS656
This course reflects a building of knowledge and skills from the previous clinical course, Clinical Management in Primary Health Care: AGNP-PC I. Students continue to progress in the nurse practitioner role and in the delivery of health care to individuals with acute and chronic health care needs. In collaboration with the health care team, students are involved in implementing and evaluating accepted medical and nursing interventions used in the primary care of patients from young adulthood through old age. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidence-based research are integrated along with complementary and alternative healing approaches for individuals and their families with health care problems. Coursework, classroom activities, and clinical assignments enhance students' critical thinking and decision-making skills for complex health care problem evaluation.

NURS658 Clinical Management for Primary Health Care/AGNP-PC-III
6 Credit Hours
Pre/Corequisite: NURS657
This course reflects a building of knowledge and skills from Clinical Management in Primary Health Care: AGNP-PC II. Students continue to progress in the nurse practitioner role and in the delivery of health care to individuals with acute and chronic health care needs. In collaboration with the health care team, students are involved in implementing and evaluating accepted medical and nursing interventions used in the primary care of patients from young adulthood through old age. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidence-based research are integrated along with complementary and alternative healing approaches appropriate for individuals and their families with health care problems. Course work, classroom activities, and clinical assignments enhance students' critical thinking and decision-making skills for complex health care problem evaluation.

NURS686 Clinical Management Primary Health Care/PNP I
5 Credit Hours
Prerequisites: NURS621 and NURS640
Corequisites: NURS616 and NURS607
This is an entry level clinical course in which the students integrate basic knowledge of human anatomy and physiology and build on advanced health assessment knowledge. The student develops an understanding of the pathologic changes and clinical manifestations that characterize common acute disorders. Students apply new understanding of pathophysiology,evolving clinical decision making skills to the interpretation of assessment data, the diagnosis of illness and the treatment of primary care in *infants, children, adolescents and young adult populations*. Students perform complete health assessments and provide client care with supervision. Collaborative strategy guide the student in the implementation and evaluation of accepted medical and nursing interventions and integrate research, teaching and consultation skills as a beginning basis for clinical practice.

NURS687 Clinical Management Primary Health Care/PNP II
6 Credit Hours
Prerequisites: NURS686 and NURS640
This course reflects a building of knowledge and skills from the previous clinical course, NURS686, PNP I. The student continues to progress in the nurse practitioner role and in the delivery of health care to infants, children, adolescents, and young adults with acute and chronic health care needs. Collaboration with the health care team, guides the students in the implementation and the evaluation of accepted medical and nursing interventions used in the care of the child health population. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidenced based research are integrated along with complementary and alternative healing approaches appropriate for the child health population. Course work, classroom activities, and clinical assignments enhance the student's critical thinking and decision-making skills, specifically for complex health care problem evaluation.

NURS688 Clinical Management Primary Health Care/PNP III
6 Credit Hours)
Prerequisite: NURS687
This is a culminating clinical course in which students are managing client care with increasing independence. The collaborative model guides the student in the implementation and evaluation of accepted medical and nursing interventions used in the care of infants, children, adolescents, and young adults. Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed in a structured environment that incorporates ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are applied to the advanced practice setting to identify and solve complex problems.

Post- Graduate Certificate (FNP, PNP, FPMHNP & AGNP-PC) - Credit Hours for clinical courses are based upon matriculation date:

https://www.upstate.edu/con/programs/post-masters-certificate/curriculum.php

NURS507/607 Advanced Health Assessment
3 Credit Hours
Pre/Corequisite: NURS621
This is the first course in the clinical advanced practice nurse (APN) series with a focus on advanced physical assessment, enhanced communication skills, and the reinforcement of health promotion and disease prevention across the life span. The course work and clinical lab activities enhance the student's history taking proficiency, physical assessment skills, critical thinking, and decision-making competency essential for planning, delivering, and evaluating health care in the population.

NURS609 Family Psychiatric and Mental Health Theory
3 Credit Hours
Pre/Corequisite: NURS607
This course presents the theoretical basis for anatomical, biological, and psychological aspects of advanced practice in psychiatric mental health nursing. Genetic, prenatal, and experienced environmental influences are explored in relation to their role in brain development and functions. Emphasis is placed on neurobiological and psychosocial theories which provide the foundation for current and emerging pharmacological and non-pharmacological interventions. Introduction to theories, concepts, and models relevant to the Family Psychiatric Mental Health Nurse Practitioner's role in the care of individuals with mental illnesses and populations at risk for mental illness are examined.

NURS612 Family Nursing Theory
3 Credit Hours
Pre/Corequisites: None
This course examines the contemporary family's structure, function, and process. Various theoretical frameworks and models are explored and applied to nursing assessment of and intervention with the healthy and high-risk family system in a variety of clinical settings. Students utilize a wellness approach to optimize health within a developmental framework and promote family resilience and adaptation throughout the life span. Psychosocial, cultural, economic, gender, and spiritual variables and their impact on family life are analyzed.

NURS613 Innovation in Information, Quality and Safety
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the skills and knowledge needed to manage information, promote quality, and maintain safety across healthcare settings. Collaborative and diverse opportunities to bring about improvement in healthcare are included. The course combines evidence-based concepts from technology, information science, communication studies, organizational quality, and health care science in order to prepare clinicians to take an active role in transforming healthcare and clinical practice. Emphasis is placed

on the nurse's active role in retrieving, interpreting, and sharing information to support an evidence-based clinical practice.

NURS508/621 Clinical Pathophysiology
3 Credit Hours
Pre/Corequisite: Matriculated graduate status.
This course focuses on the causality of alterations in human physiologic function across the lifespan. Normal physiology and pathological phenomena produced by altered states of health across the lifespan are contrasted. The human physiologic responses to these altered states are related to pertinent diagnostic values, tests, and methods. This course serves as a basis for subsequent courses that deal with the clinical diagnosis and management of health problems.

NURS627 Clinical Management FPMHNP I
5 or 8 Credit Hours
Prerequisites: NURS607 and NURS609
Pre/Corequisites: NURS616 and NURS640
This course provides the foundation for clinical management of children, adolescents, adults, and older adults with common psychiatric mental health problems. A bio-psychosocial framework for understanding the development and treatment of psychiatric disorders and mental health problems is explored. Students are introduced to the process, dynamics, principles, and ethical consideration of advanced practice psychiatric nurse interviewing, assessing, and diagnosing as well as the initial planning, implementation, and evaluation of therapeutic interventions with individuals. Therapies are introduced to promote health and prevent illness for individuals across the lifespan and their families. Psych pharmacotherapeutics and other therapeutic approaches are discussed in relation to their roles in the treatment of mental illnesses/psychiatric disorders.

NURS628 Clinical Management FPMHNP II
6 or 8 Credit Hours
Prerequisite: NURS627
Pre/Corequisites: NURS612 and NURS565
This course focuses on advanced knowledge of psychiatric-mental health nursing, including selected mental health problems and psychiatric disorders. Assessment, decision-making and therapeutic interventions with families, groups, and populations at risk are explored. The role of advanced practice nurses in the implementation of psych pharmacotherapeutic and integrated bio-psychosocial educational and supportive interventions for children, adolescents, adults, and older adults as well as culturally diverse populations is examined.

NURS629 Clinical Management FPMHNP III
6 or 8 Credit Hours
Prerequisite: NURS628
This course continues to focus on advanced knowledge of psychiatric mental health nursing, including diagnosis and management of children, adolescents, adults and older adults with mental health problems and psychiatric disorders. Societal, ethical and systems issues that affect the advanced practice psychiatric nursing role during the delivery of primary mental healthcare to specialty populations are explored.

NURS640 Pharmacology for Advanced Practice
3 Credit Hours
Pre/Corequisites: Matriculated graduate status, NURS621
An integrative approach to pharmacology is emphasized. The principles of pharmacology, pharmacokinetics, pharmaco-dynamics, and toxicology are presented. The characteristics of the major drug classifications and clinical practice implications are addressed as well as the legal and regulatory implications of drug administration and the essentials of prescription writing. The opportunity to explore related topics alone or in a group is provided, e.g., substance abuse, self-medication with over-the-counter drugs, drug therapy for pain management, drug therapy in a specialty area (maternal, pediatric, gerontologic health care), and alternatives to drug therapy.

NURS641 Clinical Management FNP I
5 or 8 Credit Hours
Prerequisites: NURS607 and NURS621
Prerequisites: NURS612, NURS565, NURS640 and NURS616
This is an entry level clinical course in which the student integrates basic knowledge of human anatomy and physiology and builds on advanced health assessment knowledge. Students develop an understanding of the pathologic changes and clinical manifestations that characterize common acute disorders. Students apply new understanding of pathophysiology and evolving clinical decision-making skills to the interpretation of assessment data and the diagnosis and treatment of primary care clients and their families across the lifespan. Students perform complete health assessments and provide client care with supervision. In collaboration with the health care team, students are involved in the implementation and evaluation of accepted medical and nursing interventions and integrate research, teaching and consultation skills as a beginning basis for clinical practice.

NURS642 Clinical Management FNP II
6 or 8 Credit Hours
Prerequisites: NURS640 and NURS641
This course reflects a building of knowledge and skills from the previous clinical course, Clinical Management in Primary Health Care: Family NP I. Students continue to progress in the nurse practitioner role and in the delivery of health care to individuals with acute and chronic health care needs. In collaboration with the health care team, students are involved in the implementation and the evaluation of accepted medical and nursing interventions used in the care of patients across the lifespan. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidenced-based research are integrated along with complementary and alternative healing approaches appropriate for individuals and their families with health care problems. Course work, classroom activities, and clinical assignments enhance students' critical thinking and decision-making skills, specifically for complex health care problem evaluation.

NURS643 Clinical Management FNP III
6 or 8 Credit Hours
Prerequisite: NURS642
This is a culminating clinical course in which students are managing client care with increasing independence. The collaborative model guides the student in the implementation and evaluation of accepted medical and nursing interventions used in

the care of the patients across the lifespan. Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed in a structured environment that incorporates ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are applied to the advanced practice setting to identify and solve complex problems.

NURS656 Clinical Management AGNP-PC-I
5 or 8 Credit Hours
Prerequisites: NURS612, NURS565, NURS607 NURS616, and NURS621
This is an entry level clinical course in which the students integrate basic knowledge of human anatomy and physiology and build on advanced health assessment knowledge. Students develop an understanding of the pathologic changes and clinical manifestations that characterize common acute and chronic disorders. Students apply a new understanding of pathophysiology, evolving clinical decision-making skills to interpret assessment data, the diagnosis of illness, and young adulthood treatment through old age. Students perform complete health assessments and provide client care with supervision. Collaborative strategies guide the student in implementing and evaluating accepted advanced practice nursing interventions and integrating research, teaching and consultation skills as a beginning basis for clinical practice.

NURS657 Clinical Management AGNP-PC-II
6 or 8 Credit Hours
Prerequisites: NURS640 and NURS656
This course reflects a building of knowledge and skills from the previous clinical course, Clinical Management in Primary Health Care: AGNP-PC I. Students continue to progress in the nurse practitioner role and in the delivery of health care to individuals with acute and chronic health care needs. In collaboration with the health care team, students are involved in implementing and evaluating accepted medical and nursing interventions used in the primary care of patients from young adulthood through old age. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidenced-based research are integrated along with complementary and alternative healing approaches appropriate for individuals and their families with health care problems. Course work, classroom activities, and clinical assignments enhance students' critical thinking and decision-making skills for complex health care problem evaluation.

NURS658 Clinical Management AGNP-PC-III
6 or 8 Credit Hours
Prerequisite: NURS657
This course reflects a building of knowledge and skills from Clinical Management in Primary Health Care: AGNP-PC II. Students continue to progress in the nurse practitioner role and in the delivery of health care to individuals with acute and chronic health care needs. In collaboration with the health care team, students are involved in implementing and evaluating accepted medical and nursing interventions used in the primary care of patients from young adulthood through old age. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidenced-based research are integrated along with complementary and alternative healing approaches appropriate for individuals and their families with health care problems. Course work, classroom activities, and clinical assignments enhance students' critical thinking and decision-making skills for complex health care problem evaluation.

NURS686 Clinical Management PNP I
5 or 8 Credit Hours
Prerequisites: NURS607, NURS621 and NURS616
This is an entry level clinical course in which the students integrate basic knowledge of human anatomy and physiology and builds on advanced health assessment knowledge. The student develops an understanding of the pathologic changes and clinical manifestations that characterize common acute disorders. Students apply new understanding of pathophysiology, evolving clinical decision making skills to the interpretation of assessment data, the diagnosis of illness and the treatment of primary care in infants, children, adolescents, and young adults populations. Students perform complete health assessments and provide client care with supervision. Collaborative strategies guide the student in the implementation and evaluation of accepted medical and nursing interventions and integrates research, teaching and consultation skills as a beginning basis for clinical practice.

NURS687 Clinical Management PNP II
6 or 8 Credit Hours
Prerequisites: NURS686 and NURS640
This course reflects a building of knowledge and skills from the previous clinical course. The student continues to progress in the nurse practitioner role and in the delivery of health care to infants, children, adolescents, and young adults with acute and chronic health care needs. Collaboration guides the students in the implementation and the evaluation of accepted medical and nursing interventions used in the care of the child health population. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidence-based research are integrated along with complementary and alternative healing approaches appropriate for the child health population. Course work, classroom activities, and clinical assignments enhance the student’s critical thinking and decision-making skills, specifically for complex health care problem evaluation.

NURS688 Clinical Management PNP III
6 or 8 Credit Hours
Prerequisite: NURS687
This is a culminating clinical course in which students are managing client care with increasing independence. Collaboration guides the student in the implementation and evaluation of accepted medical and nursing interventions used in the care of infants, children, adolescents, and young adults. Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed including ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are applied to the advanced practice setting to identify and solve complex problems.

BS-DNP (PNP, FNP, FPMHNP)

https://www.upstate.edu/con/programs/bs-doctor-nursing-practice/curriculum/index.php

NURS507 Advanced Health Assessment
3 Credit Hours
Prerequisites: None
Corequisites: None
This is the first course in the clinical advanced practice nurse (APN) series with a focus on advanced physical assessment, enhanced communication skills, and the reinforcement of health promotion and disease prevention across the life span. The course work and clinical lab activities enhance the student's history taking proficiency, physical assessment skills, critical thinking, and decision-making competency essential for planning, delivering, and evaluating health care in the population.

NURS508 Clinical Pathophysiology
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the causality of alterations in human physiologic function across the lifespan. Normal physiology and pathological phenomena produced by altered states of health across the lifespan are contrasted. The human physiologic responses to these altered states are related to pertinent diagnostic values, tests, and methods. This course serves as a basis for subsequent courses that deal with the clinical diagnosis and management of health problems.

NURS509 Genetics/Genomics
3 Credit Hours
Prerequisites: None
Corequisites: None
This course will provide the student with the knowledge to recognize the role of genetic factors in the prevention, causation, and treatment of human disease. The focus will be placed on the translation of genetic discoveries into interventions that improve health outcomes.

NURS530 Professional Role Development I: The Advanced Practice Role
3 Credit Hours
Prerequisites: None
Corequisites: None
This course provides a foundation for assuming the role of an advance practice nurse. This course provides a foundation for professional socialization to advanced practice nursing by emphasizing three main areas: the advanced practice nursing role, nursing scholarship, and theoretical foundations of nursing. The course will focus on the development and impact of advance practice nursing, theories that guide advance nursing practice, and the ethical and legal issues related to health care and advanced nursing practice. Students will examine the advance practice role as an integral member of the interprofessional team. Students will also refine skills in verbal and written communication as a member of the team and as an emerging scholar.

NURS531 Professional Role Development II: Applying Evidence-Based Practice
3 Credit Hours
Prerequisites: NURS530
Corequisites NURS530
This course focuses on issues involved in the appraisal and use of research evidence and in the conduct of research. Identification and analysis of research related to clinical practice and health care outcomes are included. Theoretical and evaluation processes relevant to nursing practice are addressed. The course will prepare the student to synthesize the results of existing research in an area of interest, to initiate collaboration with others in developing and continuously improving a practice based on research as evidence, and to understand the research expectations for advanced practice nurses. A basic understanding of research terms, the quantitative research process, and statistics is expected of students who enter the course.

NURS532 Professional Role Development III: Concepts in Informatics, Quality and Safety
3 Credit Hours
Prerequisites: NURS531
Corequisites NURS531
The purpose of this course is to provide information and opportunities to improve healthcare quality, equity, and safety using quality improvement models, healthcare technologies, and data analysis. The course will focus on identification of local and global contemporary issues in healthcare This course provides information and practical application of technologies to gather, organize, and analyze data to provide a meaningful foundation for performance improvement initiatives. Students will use evidence-based tools and data analysis to identify and analyze quality and safety issues. Students will provide leadership to plan, implement, and evaluate healthcare improvement initiatives.

NURS540 Health Promotion and Education
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the nurse educating patients, specifically in health promotion activities. Emphasis is placed on preparing the student to perform effectively as a communicator of information that enables the client to act as a responsible partner in his/her own health promotion and health care. Students study important health problems that face the world today as well as emerging concerns. Students will use health promotion and learning theories to assess, develop, and implement a patient education session with a specified group of learners. Students analyze web-based and printed educational materials and apply findings to promote consumer health promotion behaviors. The impact of health literacy, legal issues, ethical considerations related to patient education is discussed. Assignments allow students to apply and evaluate the use of health education delivery methods for various populations and practice settings.

NURS541 Research Utilization
2 Credit Hours
Prerequisites: None
Corequisites: None
This course presents research methods as tools for evaluating clinical nursing practice.

NURS565 Nurse as Educator
3 Credits Hours
Prerequisites: None
Corequisites: None
The focus of this course is on role development of the nurse as an educator. Emphasis is placed on preparing the student to perform effectively as a communicator of information which will enable the client to act as a responsible partner in his/her own health care. Recognizing teaching as an important clinical skill, this course engages students in formal inquiry into key components of patient education. Students have the opportunity to participate in the processes of needs assessment, design, development, implementation, and evaluation of education programs. Students conduct critical analysis of educational materials, apply research findings to patient education, and conduct a cost analysis of educational programs. The impact of legal issues, ethical dilemmas, and changes in the health care delivery system on patient education is discussed.

NURS605 Public Health Policy
3 Credit Hours
Prerequisites: None
Corequisites: None
The purpose of this course is to critically analyze the ways in which public policy affects local and global health processes and outcomes. Students examine the broad context of health and social policy that impacts the health of the community and drives how strategies to improve the health of communities are structured. This course prepares the student to demonstrate leadership as a DNP by taking an active role in health advocacy and health policy development. Issues such as social justice, access to care, health care financing, and nurses in the political arena will be explored.

NURS607 Advanced Health Assessment
3 Credit Hours
Corequisite: NURS621
This is the first course in the clinical advanced practice nurse (APN) series with a focus on advanced physical assessment, enhanced communication skills, and the reinforcement of health promotion and disease prevention across the life span. The course work and clinical lab activities enhance the student's history taking proficiency, physical assessment skills, critical thinking, and decision-making competency essential for planning, delivering, and evaluating health care in the population.

NURS608 Epidemiology and Population Health
3 Credit Hours
Prerequisite: None
Corequisites: NURS632
This course prepares DNP students to relate the science of epidemiology, including genetic and environmental epidemiology, to evidence-based nursing practice in providing care to populations. Course content will cover identifying and defining population outcomes, concepts of epidemiology used in population-based research, and using data and information technology to target at-risk populations to improve health outcomes. In addition, students will analyze health policy at the population level and interpret trends in care delivery.

NURS609 Family Psychiatric and Mental Health Theory
3 Credit Hours
Corequisite: NURS607
This course presents the theoretical basis for anatomical, biological, and psychological aspects of advanced practice in psychiatric mental health nursing. Genetic, prenatal, and experienced/environmental influences are explored in relation to their role in brain development and functions. Emphasis is placed on neurobiological theories of psychiatric disorders and developmental, family, and psychodynamic processes. Introduction to theories, concepts, and models relevant to the Family Psychiatric Mental Health Nurse Practitioner's role in the care of persons with mental illnesses and populations at risk for mental illness are examined.

NURS610 Nursing Theory
3 Credit Hours
Pre/Corequisite: Admission to Graduate Study or permission of course faculty.
This course focuses on the development of nursing science through the use of nursing theoretical frameworks. Students are guided in the examination of the development of conceptualizations and in the critique of concepts, theories, and boundaries for nursing study, as well as the implications for using theories of nursing and theories in nursing. Emphasis is on critical thinking, via description, analysis, and evaluation of nursing theory for application to practice. The importance of research to the continuing development of nursing theory as a method of building nursing's unique knowledge base is emphasized throughout the course.

NURS612 Family Nursing Theory
3 Credit Hours
Prerequisites: None
Corequisites: None
This course examines the contemporary family's structure, function, and process. Various theoretical frameworks and models are explored and applied to nursing assessment of and intervention with the healthy and high-risk family system in a variety of clinical settings. Students utilize a wellness approach to optimize health within a developmental framework and promote family resilience and adaptation throughout the life span. Psychosocial, cultural, economic, gender, and spiritual variables and their impact on family life are analyzed.

NURS613 Innovation in Information, Quality and Safety
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the skills and knowledge needed to manage information, promote quality, and maintain safety across healthcare settings. Collaborative and diverse opportunities to bring about improvement in healthcare are included. The course combines evidence-based concepts from technology, information science, communication studies, organizational quality, and health care science in order to prepare clinicians to take an active role in transforming healthcare and clinical practice. Emphasis is placed on the nurse's active role in retrieving, interpreting, and sharing information to support an evidence-based clinical practice.

NURS616 Advanced Nursing Research
3 Credit Hours
Prerequisites: None
Corequisites: None
This graduate level course examines quantitative and qualitative nursing research methods, principles, and methods of measurement, as well as skills for critical evaluation of nursing research. Identification and analysis of research related to clinical practice and health care outcomes are included. Students develop skills and knowledge needed to review and recognize the strength of evidence and recommend practice changes if indicated. This course builds upon previous knowledge of the research process, critiquing of research, and understanding of the application of statistical findings.

NURS620 Legal and Ethical Issues
3 Credit Hours
Prerequisites: None
Corequisites: None
This course provides a foundation for values, codes and principles governing decisions in advanced nursing practice, conduct and relationships. The format of the course is to use case analysis and introduce a broad range of clinical ethical issues and to present the theoretical and practical knowledge that enables practitioners to provide leadership in responding to the ethical challenges confronting the health care system today. There is specific emphasis on legal concepts, the judicial process, ethical decision-making, and exploring interdisciplinary collaboration to strengthen ethical dialogue and decision making.

NURS621 Clinical Pathophysiology
3 Credit Hours
Pre/Corequisite: Matriculated graduate status
This course focuses on the causality of alterations in human physiologic function across the lifespan. Normal physiology and pathological phenomena produced by altered states of health across the lifespan are contrasted. The human physiologic responses to these altered states are related to pertinent diagnostic values, tests, and methods. This course serves as a basis for subsequent courses that deal with the clinical diagnosis and management of health problems.

NURS626 Leadership for the Advanced Practice Nurse
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the skills and knowledge needed by the Advanced Practice Nurse (APN) to function in the role of a leader in health care. Emphasis is placed on the development of individual APNs as informed and collaborative leaders within the health care system who use current research-based evidence in their role. Utilizing the nursing process, and leadership theory and organizational theory, students analyze the effectiveness of health care organizations and develop interventions to improve the organizational effectiveness. Issues related to the APN's role as an active participant in the legislation of health care policy are explored.

NURS627 Clinical Management I
6 Credit Hours
Prerequisites: NURS607, NURS621 and NURS609
Corequisites: NURS616 and NURS640
This course provides the foundation for clinical management of children, adolescents, adults, and older adults with common psychiatric mental health problems. A bio-psychosocial framework for understanding the development and treatment of psychiatric disorders and mental health problems is explored. Students are introduced to the process, dynamics, principles, and ethical consideration of advanced practice psychiatric nurse interviewing, assessing, and diagnosing as well as the initial planning, implementation, and evaluation of therapeutic interventions with individuals. Therapies are introduced to promote health and prevent illness for individuals across the lifespan and their families. Psych pharmacotherapeutics and other therapeutic approaches are discussed in relation to their roles in the treatment of mental illnesses/psychiatric disorders.

NURS628 Clinical Management II
6 Credit Hours
Prerequisites: NURS627 and NURS 640
Corequisites: NURS612 and NURS565
This course focuses on advanced knowledge of psychiatric-mental health nursing, including selected mental health problems and psychiatric disorders. Assessment, decision-making and therapeutic interventions with families, groups, and populations at risk are explored. The role of advanced practice nurses in the implementation of psych pharmacotherapeutic and integrated bio-psychosocial educational and supportive interventions for children, adolescents, adults, and older adults as well as culturally diverse populations is examined.

NURS629 Clinical Management III
6 Credit Hours
Prerequisite: NURS628
Corequisite: None
This course continues to focus on advanced knowledge of psychiatric mental health nursing, including diagnosis and management of children, adolescents, adults and older adults with mental health problems and psychiatric disorders. Societal, ethical and systems issues that affect the advanced practice psychiatric nursing role during the delivery of primary mental healthcare to specialty populations are explored.

NURS630 Clinical Management IV
6 Credit Hours
Prerequisite: NURS629
Corequisite: None
This is a culminating clinical course in which students are managing client care with increasing independence. The collaborative model guides the student in implementing and evaluating accepted medical and nursing interventions used in the care of the patients (across the lifespan for FNP and FPMHNP) (infants, children, adolescents, and young adults for PNP). Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed in a structured environment that incorporates ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are

applied to the advanced practice setting to identify and solve complex problems.

NURS632 Statistics and Methods for the DNP Project
4 Credit Hours
Prerequisites: None
Corequisites: None
This course is designed to enhance the DNP student's ability to select and apply methods (beyond Quality Improvement) required to implement a range of scholarly project designs. Quantitative methods include data collection, descriptive and inferential statistical analyses (including linear regression) utilizing appropriate software packages. Qualitative approaches for data collection and analysis will be introduced. The course will focus on identification and selection of methods appropriate for answering clinical questions and interpreting and presenting results obtained from these methods.

NURS637 Scholarly Writing and Program Development
3 Credit Hours
Prerequisite: NURS608
Corequisites: None
Program development is an ongoing systematic process for the planning, funding, implementation, and evaluation of programs. Content will cover principles and models for program planning, grant writing, and formative and summative outcomes measurement. In addition, students will gain practical skills in project management, program delivery and marketing. Students will acquire content knowledge, writing proficiency, research skills, organizational ability, and principles of persuasion. This course will provide students with the background necessary to develop competitive funding proposals and achieve success in health, social, and behavioral programs in a variety of settings.

NURS638 Mental Health Across the Lifespan
3 Credit Hours
Prerequisites: None
Corequisites: None
This course assists students in successfully addressing mental health issues within the primary care setting. A bio-psychosocial framework for understanding the development and treatment of common psychiatric disorders and mental health problems is explored. Focus is on the diagnosis and treatment of patients with co-morbid and psychiatric conditions within the broader context of the primary care setting. Emphasis is placed on clinical reasoning related to assessment and diagnosis, treatment planning and clinical management. Psychopharmacotherapeutics and other therapeutic approaches are discussed in relation to treatment of mental illness/psychiatric disorders within the primary care setting. Therapies are introduced to promote health and prevent illness for individuals and families across the lifespan.

NURS640 Pharmacology for Advanced Practice
3 Credit Hours
Corequisites: Matriculated graduate status, NURS621
An integrative approach to pharmacology is emphasized. The principles of pharmacology, pharmacokinetics, pharmaco-dynamics, and toxicology are presented. The characteristics of the major drug classifications and clinical practice implications are addressed as well as the legal and regulatory implications of drug administration and the essentials of prescription writing. The opportunity to explore related topics alone or in a group is provided, e.g., substance abuse, self-medication with over-the-counter drugs, drug therapy for pain management, drug therapy in a specialty area (maternal, pediatric, gerontologic health care), and alternatives to drug therapy.

NURS641 Clinical Management FNP I
6 Credit Hours
Prerequisites: NURS 607, NURS621
Corequisites: NURS612, NURS565 and NURS640
This is an entry level clinical course in which the student integrates basic knowledge of human anatomy and physiology and builds on advanced health assessment knowledge. Students develop an understanding of the pathologic changes and clinical manifestations that characterize common acute disorders. Students apply new understanding of pathophysiology and evolving clinical decision-making skills to the interpretation of assessment data and the diagnosis and treatment of primary care clients and their families across the lifespan. Students perform complete health assessments and provide client care with supervision. In collaboration with the health care team, students are involved in the implementation and evaluation of accepted medical and nursing interventions and integrate research, teaching and consultation skills as a beginning basis for clinical practice.

NURS642 Clinical Management/FNP II
6 Credit Hours
Prerequisites: NURS640 and NURS641
This course reflects a building of knowledge and skills from the previous clinical course, Clinical Management in Primary Health Care: Family NP I. Students continue to progress in the nurse practitioner role and in the delivery of health care to individuals with acute and chronic health care needs. In collaboration with the health care team, students are involved in the implementation and the evaluation of accepted medical and nursing interventions used in the care of patients across the lifespan. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidenced-based research are integrated along with complementary and alternative healing approaches appropriate for individuals and their families with health care problems. Course work, classroom activities, and clinical assignments enhance students' critical thinking and decision-making skills, specifically for complex health care problem evaluation.

NURS643 Clinical Management/FNP III
6 Credit Hours
Prerequisite: NURS642
This is a culminating clinical course in which students are managing client care with increasing independence. The collaborative model guides the student in the implementation and evaluation of accepted medical and nursing interventions used in the care of the patients across the lifespan. Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed in a structured environment that incorporates ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are applied to the advanced practice setting to identify and solve complex problems.

NURS644 Clinical Management/FNP IV
5 Credit Hours
Prerequisites: NURS641, NURS642 and NURS643
This is a culminating clinical course in which students are managing client care with increasing independence. The collaborative model guides the student in implementing and evaluating accepted medical and nursing interventions used in the care of the patients (across the lifespan for FNP and FPMHNP) (infants, children, adolescents, and young adults for PNP). Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed in a structured environment that incorporates ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are applied to the advanced practice setting to identify and solve complex problems.

NURS669 Clinical Immersion
1-2 credits by advisement
Prerequisites: Successful completion of previous three clinical courses
Corequisites: None
The focus of this course is to expand, deepen, or enrich advanced practice skills relevant to area of clinical specialization. In clinical and simulated settings, learning opportunities will promote the integration of advanced practice competencies, leadership, and practice inquiry. Emphasis will be placed on self-directed and precepted learning experiences, in-depth clinical skill building, and decision making, continuity of care, and interprofessional collaboration.

NURS680 Professional Role Development IV: Ethics and Advanced Leadership
3 Credit Hours
Prerequisites: NURS532
Corequisites: None
This course focuses on the skills and knowledge needed by the Advanced Practice Nurse (APN) to function as a leader in healthcare. The course focuses on the development of individuals as informed and collaborative leaders within the healthcare system, with use of evidence-based research to promote improvement throughout the system. This class is designed to create an atmosphere of autonomy, personal responsibility, open-mindedness, and continuous learning. Emphasis is placed on the values of, health care equity, financial stewardship, policy analysis, and advocacy for patient dignity, quality, and safety. This course is designed to offer both theoretical foundations of leadership and application of practical skills for nursing leaders.

NURS686 Clinical Management/PNP I
6 Credit Hours
Prerequisites: NURS607, NURS621
Corequisites: NURS640 and NURS616
This is an entry level clinical course in which the students integrate basic knowledge of human anatomy and physiology and builds on advanced health assessment knowledge. The student develops an understanding of the pathologic changes and clinical manifestations that characterize common acute disorders. Students apply new understanding of pathophysiology evolving clinical decision-making skills to the interpretation of assessment data, the diagnosis of illness and the treatment of primary care in infants, children, adolescents, and young adult populations. Students perform complete health assessments and provide client care with supervision. Collaborative strategies guide the student in the implementation and evaluation of accepted medical and nursing interventions and integrates research, teaching and consultation skills as a beginning basis for clinical practice.

NURS687 Clinical Management/PNP II
6 Credit Hours
Prerequisites: NURS686 and NURS640
This course reflects a building of knowledge and skills from the previous clinical course. The student continues to progress in the nurse practitioner role and in the delivery of health care to infants, children, adolescents, and young adults with acute and chronic health care needs. Collaboration guides the students in the implementation and the evaluation of accepted medical and nursing interventions used in the care of the child health population. Effective use of skills required for clinical management, education, consultation, referral, and follow-up are emphasized. Therapeutic interventions based upon evidence-based research are integrated along with complementary and alternative healing approaches appropriate for the child health population. Course work, classroom activities, and clinical assignments enhance the student's critical thinking and decision-making skills, specifically for complex health care problem evaluation.

NURS688 Clinical Management/PNP III
6 Credit Hours
Prerequisite: NURS687
This is a culminating clinical course in which students are managing client care with increasing independence. Collaboration guides the student in the implementation and evaluation of accepted medical and nursing interventions used in the care of infants, children, adolescents, and young adults. Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed including ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are applied to the advanced practice setting to identify and solve complex problems.

NURS689 Clinical Management/PNP IV
5 Credit Hours
Prerequisite: NURS688
This is a culminating clinical course in which students are managing client care with increasing independence. The collaborative model guides the student in implementing and evaluating accepted medical and nursing interventions used in the care of the patients (across the lifespan for FNP and FPMHNP) (infants, children, adolescents, and young adults for PNP). Students further develop leadership, research, teaching, and consultation skills as a basis for clinical practice. Practice issues are identified and discussed in a structured environment that incorporates ethical concepts and effective use of resources for beginning autonomous practice. Theoretical concepts of organizational systems and health care politics and policy are applied to the advanced practice setting to identify and solve complex problems.

NURS696 Diagnostic and Clinical Procedures
3 Credit Hours
Prerequisite: None
Corequisites: None
The focus of the course is the application of diagnostic and clinical procedures performed by the Nurse Practitioner in various practice settings. This clinical procedure course introduces students to several basic diagnostic and therapeutic procedures, both invasive and noninvasive. These include lab and ECG interpretation, basic suturing, X-ray interpretation, and minor office procedures.

NURS710 Foundations of the DNP Project
Variable Credit Hours
Prerequisites: NURS632 and NURS608
Corequisites: None
This doctoral level course focuses on providing the resources for students to evaluate, translate, and integrate published research results into clinical practice. Building on previous course work, students will continue to identify clinical practice problems, develop answerable clinical research questions, search for best evidence, and appraise evidence using epidemiological, biostatistical, and scientific principles. In addition, students will integrate best evidence while taking into account patient values and preferences in the planning of answering clinical questions for advanced nursing practice.

NURS711 Organization Behavior and Systems Leadership
3 Credit Hours
Prerequisites: None
Corequisites: None
Organizational and systems leadership skills critical for culturally sensitive nursing practice to improve healthcare and outcomes are enhanced. Focus is on transformational leadership, measurement of outcomes, data driven decision–making, and the business realities of leading within healthcare. The emphasis is on skills and competencies needed to provide a scientific knowledge base for leadership in quality healthcare and systems of change focusing on not only the outcome, but safety, fiscal principles, efficiency, and quality.

NURS713 Advancements in Informatics, Quality and Safety
3 Credit Hours
Prerequisites: None
Corequisites: None
This course focuses on the skills and knowledge needed to promote quality, maintain patient safety, and manage information across healthcare settings. Collaborative and diverse opportunities to bring about improvement in healthcare are included. The course combines evidence-based concepts from technology, information science, communication studies, patient safety, organizational quality, and health care science to prepare nurses to take an active role in transforming healthcare and clinical practice. Emphasis is placed on the nurse's active role in retrieving, interpreting, and sharing information to support an evidence-based clinical practice.

NURS722 DNP Project I
Variable Credit Hours
Prerequisite: NURS710
Corequisites: None
This course is the first of three sequential clinical courses that focuses on the DNP project development providing experiential learning opportunities for the student. The course challenges the student to finalize their DNP project proposal building upon the foundation of clinical, behavioral, and social sciences. Students will have the opportunity to collaborate with doctoral faculty and mentor experts to refine and develop their project proposal including submission of the final project proposal paper, Institutional Review Board (IRB) application and project implementation once approved by the IRB. Throughout the three sequential clinical courses, the DNP student will employ the expanded advanced practice nursing role competencies focusing on their populations of interest. The student meets a minimum of 50 clinical hours.

NURS723 DNP Project II
Variable Credit Hours
Prerequisites: NURS722
Corequisites: None
This course is the second of three sequential clinical courses with a focus on the implementation of the DNP project developed in NURS 722 providing experiential learning opportunities for the student. As the approved project progresses the student continues with the opportunity to collaborate with doctoral faculty and mentor experts to collect and analyze data to evaluate the scholarly project's outcomes. Throughout the three sequential clinical courses, the DNP student will employ expanded advanced practice nursing role competencies focusing on their populations of interest. The student meets a minimum of 50 clinical hours.

NURS725 DNP Project III
Variable Credit Hours
Prerequisite: NURS723
Corequisites: None
This course is the third of three sequential clinical courses with a continued focus on the completion of the DNP project developed in the previous two clinical courses providing experiential learning opportunities for the student. As the project progresses the student continues with the opportunity to collaborate with doctoral faculty and mentor experts to analyze data and formulate the final project outcome(s). The student will be required to develop a project dissemination plan to include a local, state, or national conference and a manuscript ready for submission to a peer-reviewed journal. The sequential clinical courses provide students with experiential learning competencies for future scholarship. The student meets a minimum of 50 clinical hours.

NURS730 Project Defense
1 Credit Hour
Prerequisite: NURS725
Corequisites: None
This is the culminating DNP course, where the student will provide a final presentation and defense of their project.

Doctor of Nursing Practice

https://www.upstate.edu/con/programs/doctor-nursing-practice/curriculum.php

NURS605 Public Health Policy
3 Credit Hours
Prerequisites: None
Corequisites: None
The purpose of this cour.se is to critically analyze the ways in which public policy affects local and global health processes and outcomes. Students examine the broad context of health and social policy that impacts the health of the community and drives how strategies to improve community health are structured. This course prepares students to demonstrate leadership as a DNP-prepared nurse to take an active role in health advocacy and health policy development. Issues such as social justice, access to care, health care financing, and nurses in the political arena will be explored.

NURS608 Epidemiology and Population Health
3 Credit Hours
Prerequisites: None
Corequisite: NURS632
This course prepares DNP students to relate the science of epidemiology, including genetic and environmental epidemiology, to evidence-based nursing practice in providing care to populations. Course content will cover identifying and defining population outcomes, concepts of epidemiology used in population-based research, and using data and information technology to target at-risk populations to improve health outcomes.

NURS620 Legal and Ethical Issues
3 Credit Hours
Prerequisites: None
Corequisites: None
This course provides a foundation for values, codes and principles governing decisions in advanced nursing practice, conduct and relationships. The format of the course is to use a case analysis and introduce a broad range of clinical ethical issues and to present the theoretical and practical knowledge that enables practitioners to provide leadership in responding to the ethical challenges confronting the health care system today. There is specific emphasis on legal concepts, the judicial process, ethical decision making, and exploring interdisciplinary collaboration to strengthen ethical dialogue and decision making.

NURS632 Statistics and Methods for the DNP Project
4 Credit Hours
Prerequisites: None
Corequisites: None
This course is designed to broaden and enrich the DNP student's knowledge and understanding of biostatistics to facilitate implementation of evidence-based care to populations. The course includes descriptive and inferential statistical analyses applicable to the health of populations. Multivariate methodologies will be applied in the analysis of population trends and outcomes. Additional skills include use of statistical software for analysis and interpretation of statistical tests.

NURS637 Scholarly Writing and Program Development
3 Credit Hours
Prerequisite: NURS608
Corequisites: None
Program development is an ongoing systematic process for the planning, funding, implementation, and evaluation of programs. Content will cover principles and models for program planning, grant writing, and formative and summative outcomes measurement. In addition, students will gain practical skills in project management, program delivery and marketing. Students will acquire content knowledge, writing proficiency, research skills, organizational ability, and principles of persuasion. This course will provide students with the background necessary to develop competitive funding proposals and achieve success in health, social, and behavioral programs in a variety of settings.

NURS651 Genetics/Genomics for the APRN
2 Credit Hours
Prerequisites: None
Corequisites: None
This course will provide the student with advanced practice experience with the knowledge to recognize the role of genetic factors in the prevention, causation, and treatment of human disease. The focus will be placed on translating genetic discoveries into interventions that can be implemented in clinical practice to improve health outcomes for the populations they serve.

NURS710 Foundations of the DNP Project
3 Credit Hours
Prerequisites: NURS632 and NURS608
Corequisites: None
This doctoral level course focuses on providing the resources for students to evaluate, translate, and integrate published research results into clinical practice. Building on previous course work, students will continue to identify clinical practice problems. Students will develop answerable clinical questions, search for best evidence, and appraise evidence using epidemiological, biostatistical, and scientific principles. In addition, students will integrate best evidence while considering patient values and preferences in the planning of answering clinical questions for advanced nursing practice.

NURS711 Organizational Behavior and Systems Leadership
3 Credit Hours
Prerequisites: None
Corequisites: None
Organizational and systems leadership skills critical for culturally sensitive nursing practice to improve healthcare and outcomes are enhanced. Focus is on transformational leadership, measurement of outcomes, data driven decision-making, and the business realities of leading within healthcare. The emphasis is on skills and competencies needed to provide a scientific knowledge base for leadership in quality healthcare and systems of change focusing on not only the outcome, but safety, fiscal principles, efficiency, and quality.

NURS713 Advancements in Informatics, Quality and Safety
3 Credit Hours
Prerequisites: None
Corequisites: None
This course emphasizes the leadership and development of nursing science in the fields of informatics, quality, and safety for the transformation of healthcare and promotion of population health outcomes. Through the perspective of collaborative, inter-professional initiatives, health information systems, policies and practices are designed, reviewed, analyzed, and revised for the implementation of emerging technologies and the continuous promotion of quality in patient-centered care and population health outcomes. Analytical methods and clinical scholarship are integrated into the designing, implementing, evaluating, and disseminating of effective evidence-based practice and continuous quality and safety improvement needed in health care.

NURS722 DNP Project I
3 Credit Hours
Prerequisite: NURS710
Corequisites: None
This course is the first of three sequential clinical course that focuses on the DNP project development providing experiential learning opportunities for the student. The course challenges the student to finalize their DNP project proposal building upon the foundation of clinical, behavioral, and social sciences. Students will have the opportunity to collaborate with doctoral faculty and mentor experts to refine and develop their project proposal including submission of the final project proposal paper, IRB application and project implementation once approved by the IRB. Throughout the three sequential clinical courses, the DNP student will establish the expanded advanced practice nursing role focusing on their populations of interest. The student meets a minimum of 150 clinical hours.

NURS723 DNP Project II
3 Credit Hours
Prerequisite: NURS722
Corequisites: None
This course is the second of three sequential clinical courses with a focus on the implementation of the DNP project developed in NURS722 providing experiential learning opportunities for the student. As the approved project progresses the student continues with the opportunity to collaborate with doctoral faculty and mentor experts to collect and analyze data to evaluate the scholarly project's outcomes. Throughout the three sequential clinical courses, the DNP student will employ expanded advanced practice nursing role competencies focusing on their populations of interest. The student meets a minimum of 150 clinical hours.

NURS725 DNP Project III
4 Credit Hours
Prerequisite: NURS723
Corequisites: None
This course is the third of three sequential clinical courses with a continued focus on the completion of the DNP project developed in the previous two clinical courses providing experiential learning opportunities for the student. As the project progresses the student continues with the opportunity to collaborate with doctoral faculty and mentor experts to analyze data and formulate the final project outcome(s). The student will be required to disseminate the project findings. The sequential clinical courses provide students with experiential learning competencies for future scholarship. The student meets a minimum of 150 clinical hours.

NURS730 DNP Project Defense
1 Credit Hour
Prerequisite: NURS725
Corequisites: None
This is the culminating DNP course, where the student will provide a final presentation and defense of their project.

UPSTATE
MEDICAL UNIVERSITY