

Barry and Judy Silverman College of Pharmacy



Barry and Judy Silverman College of Pharmacy



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Dean

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Dean

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Chair, Sociobehavioral and Administrative Pharmacy

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Interim Chair, Pharmacy Practice

Vision Statement

To be a preeminent college of pharmacy that cultivates leadership, innovation, and diversity in education, practice, research, and service to advance the health and well-being of our communities

Mission Statement

To educate and develop inclusive leaders in the science and practice of pharmacy who will improve health through discovery, innovation, advocacy, and the delivery of optimal patient care

NSU Core Values

- Integrity
- Academic Excellence
- Community
- Diversity
- Innovation
- Opportunity
- Scholarship/Research
- Student Centered

Overview

With the nation struggling to deliver high-quality, affordable health care, the pharmacist's role has expanded rapidly from drug compounding and distribution to a patient-centered role. NSU's Barry and Judy Silverman College of Pharmacy (BJCOP) is educating its students in practices vital to meeting the challenges facing the profession and leading to improved health and wellness while reducing health care costs.

The college admitted its first class in 1987, becoming the first college of pharmacy in South Florida. Since then, it has graduated more than 5,000 pharmacy professionals. The college offers the Doctor of Pharmacy (Pharm.D.) degree program, a Ph.D. or M.S. in Pharmaceutical Sciences, and an M.S. in Pharmaceutical Affairs.

Pharmacists are experts on drugs and therapeutic goals, their biological action and uses, formulation, adverse effects, and potential for drug interactions. Pharmacists must be able to think quickly and accurately in an organized manner, despite environmental distractions; be able to communicate effectively; and have interprofessional abilities sufficient to interact with others. They consider both the medication and the patient to ensure the patient has the right drug, in the right amount, for the right length of time, and with minimal adverse effects. The result is improved health care.

Pharmacists practice in a variety of direct and indirect patient-care settings, including, but not limited to, community pharmacies, hospitals, extended-care facilities, public health clinics, research and development, manufacturing, academia, and governmental and nongovernmental agencies.

The college embraces these opportunities for pharmacists to assume a wider role in the health care needs of society, and qualified students have the opportunity to earn concurrent master's degrees in either business administration (M.B.A.), public health (M.P.H.), or health informatics (M.S.).

Ph.D. graduates focus on expanding the science of drug knowledge by creating and testing new drug molecules or using technology to develop new dosage forms. This field responds to needs identified by practicing pharmacists in caring for patients. The pharmaceutical scientist is very knowledgeable in a variety of areas including, but not limited to, pharmacology, pharmaceuticals, pharmacokinetics, and administration.

The M.S. in Pharmaceutical Affairs and the M.S. in Pharmaceutical Sciences prepare students interested in pursuing positions in academia, industry, research organizations, health care systems, and government and nongovernmental agencies. The degrees also provide additional preparation for students interested in pursuing a Pharm.D. or Ph.D. degree.

Professional Accreditation

The Accreditation Council for Pharmacy Education, 190 S. LaSalle Street, Suite 3000, Chicago, IL 60603-3446, (312) 664-3575, Fax 866-228-2631, website: acpe-accredit.org, has accredited the Doctor of Pharmacy Program of the College of Pharmacy, Nova Southeastern University.

Memberships

NSU's Barry and Judy Silverman College of Pharmacy is a member of the American Association of Colleges of Pharmacy. The college is also a member of the International Pharmaceutical Federation (FIP).

Facilities

The college's administrative offices are located on the third floor of the Health Professions Division Administration Building. Pharmacy practice and research laboratories are located on the third floor of the Library/Laboratories Building. The NSU Palm Beach Campus and NSU Puerto Rico Regional Campus have administrative offices, classrooms, and labs on site. Experiential sites are primarily located throughout Florida and Puerto Rico, and pharmacy practice faculty members are assigned to innovative, patient-centered facilities in South Florida and Puerto Rico.

In the fall of 2000, the NSU Barry and Judy Silverman College of Pharmacy opened a program in Palm Beach County. After spending many years at a shared site, NSU moved to its own 75,000-square-foot facility. Classes began at the new location in the fall of 2011. The NSU Palm Beach Campus features classrooms and labs, a student lounge, a fitness area, a pharmacy library, and administrative offices. In the fall of 2001, a full-time program on the campus of Pontificia Universidad Catolica de Puerto Rico in Ponce, Puerto Rico, was opened. The Puerto Rico program moved to its new location in San Juan in 2014. The San Juan location has state-of-the-art facilities for pharmacy students and is equipped with lecture halls; study rooms; computer, pharmaceuticals, and patient-care management laboratories; a Drug Information Center; and additional meeting and classroom space fully equipped for compressed interactive video.

Each campus has administrators and faculty and staff members. Interactive video technology is used to provide lectures among the three campuses simultaneously. This provides for live interaction between lecturer and students regardless of location. Identical handouts, tests, and texts are used. Communication through telephone, fax, interactive technologies, and email are available to students at all campuses. All students have access to the Martin and Gail Press Health Professions Division Library, computer labs, online learning resources, and the vast technological innovations provided by NSU, which has been a leader in distance education programs for many years.

The NSU Pharmacy and Pharmaceutical Wellness Center are located next to the Dr. Sanford L. Ziff Health Care Center on the Fort Lauderdale/Davie Campus on the corner of University Drive and SW 30th Avenue. The pharmacy is open to the public and offers a range of disease management services, including diabetes care and anticoagulation management, to name a few. The pharmacy recently added an herbal and supplementation therapy clinic, a service that has been requested often by many patients. Furthermore, the pharmacy offers compounding, medication therapy management services (medication checkups), and adult vaccinations. It teaches pharmacy students throughout the spectrum of their professional student career.

Core Performance Standards for Admission and Progress

The Nova Southeastern University Health Professions Division is pledged to the admission and matriculation of qualified students and wishes to acknowledge awareness of laws that prohibit discrimination against anyone on the basis of race, color, religion or creed, sex, pregnancy status, national or ethnic origin, nondisqualifying disability, age, ancestry, marital status, sexual orientation, gender, gender identity, military service, veteran status, or political beliefs or affiliations.

Regarding those students with verifiable disabilities, the university will not discriminate against such individuals who are otherwise qualified, but will expect applicants and students to meet certain minimal technical standards (core performance standards) as set forth herein, with or without reasonable accommodation. In adopting these standards, the university believes it must keep in mind the ultimate safety of the patients whom its graduates will eventually serve, as well as the efficacy and safety in the learning environment. The standards reflect what the university believes are reasonable expectations required of health professions students and personnel in performing common functions. Any exceptions to such standards must be approved by the dean of the student's particular college, based upon appropriate circumstances.

The holders of health care degrees must have the knowledge and skills to function in a broad variety of clinical situations and to render a wide spectrum of patient care. In order to carry out the activities described below, candidates for Health Professions Division degrees must be able to integrate consistently, quickly, and accurately all information received, and they must have the ability to learn, integrate, analyze, and synthesize data.

Honor and integrity of the health professions student and health care professional are essential and depends on the exemplary behavior of all health care providers in their relations with patients, faculty members, and colleagues. This includes accountability to oneself and to relationships with fellow students, future colleagues, faculty members, and patients who come under the students' care or contribute to their training and growth, as well as members of the general public. This applies to personal conduct that reflects on the student's honesty and integrity in both academic and nonacademic settings, whether or not involving an NSU-sponsored activity. All students must have the capacity to manage their lives and anticipate their own needs. Upon accepting admission to NSU, each student subscribes to, and pledges complete observance to, NSU's Student Code of Conduct Policies. A violation of these standards is an abuse of the trust placed in every student and could lead to suspension or dismissal.

Candidates for degrees offered by the Health Professions Division must have, with or without reasonable accommodation, multiple abilities and skills, including intellectual, conceptual, integrative, and quantitative abilities; interpersonal communication; mobility and strength; motor skills; and hearing, visual, tactile, behavioral, and social attributes. Candidates for admission and progression must be able to demonstrate these abilities and skills in a reasonably independent manner.

Intellectual, Conceptual, Integrative, and Qualitative Abilities

These abilities include measurement, calculation, reasoning, analysis, and synthesis. Problem-solving—a critical skill—requires all of these intellectual abilities. Candidates and students must have critical-thinking ability sufficient for good clinical judgment. This is necessary to identify cause/effect relationships in clinical situations and to develop plans of care. In addition, candidates and students should be able to comprehend three-dimensional relationships and to understand the spatial relationships of structures. An individual is expected to be able to perform multiple tasks in a diverse, dynamic, highly competitive, and challenging learning environment. Examples include, but are not limited to, identification of cause/effect relationships in clinical situations, development of treatment plans, transferring knowledge from one situation to another, evaluating outcomes, problem-solving, prioritizing, and using short- and long-term memory. All individuals are expected to meet their program requirements on a satisfactory level as determined by HPD administration or the applicable college/program administration. College of Pharmacy students must be able to perform multiple tasks in a diverse, dynamic, highly competitive, and challenging environment. They must be able to think quickly and accurately in an organized manner, despite environmental distractions.

Interpersonal Communication

Candidates and students must be able to interact and communicate effectively, with respect to policies, protocols, and process—with faculty and staff members, students, patients, patient surrogates, and administration during the student's educational program. They must be able to communicate effectively and sensitively with patients, faculty members, and an interprofessional health care team. Communication includes verbal and nonverbal communication, including, but not limited to, speaking, reading, writing, gestures, and body language. They must have interpersonal abilities sufficient to interact with individuals, families, and groups from a variety of social, emotional, cultural, and intellectual backgrounds. A student must have sufficient proficiency with English to retrieve information from texts and lectures and communicate concepts on written and oral exams and patient charts; elicit patient backgrounds; describe patient changes in moods, activity, and posture; and coordinate patient care with all members of the health care team. A student must be able to communicate or provide communication in lay language so that patients and their families can understand the patient's conditions, treatment options, and instructions. The student must be able to accurately enter information in the patient's electronic health record, according to his or her program's requirements.

Motor Skills

Candidates and students must have sufficient motor function to execute movements reasonably required to provide general care and emergency treatment to patients. Examples of emergency treatment reasonably required of some health care professionals are cardiopulmonary resuscitation (CPR); administration of intravenous medication; the application of pressure to stop bleeding; the opening of obstructed airways; and the ability to calibrate and use laboratory equipment, grasp and manipulate small objects/instruments, use a computer keyboard, and other related laboratory and medical equipment. Such actions require coordination of both gross and fine muscular movements, equilibrium, and functional use of the senses of touch and vision. College of Pharmacy candidates and students must have sufficient visual and motor skills to weigh chemical and pharmaceutical (including intravenous) solutions, prepare prescriptions, and perform sterile procedures.

Strength and Mobility

Candidates and students must have sufficient mobility to attend emergency codes and to perform such maneuvers as CPR when required. They must have the physical ability to move sufficiently from room to room and to maneuver in small places. Pharmacy students must be able to move about within a laboratory, a pharmacy setting, and a patient's room.

Hearing

Candidates and students must have sufficient auditory ability to monitor and assess health needs. They must be able to hear information given by the patient in answer to inquires; to hear cries for help; to hear features in an examination, such as the auscultatory sounds; and to monitor equipment.

Visual

Candidates and students must have visual ability sufficient for observation, assessment, and rendering of treatment necessary in patient care. It must be consistent in many cases with being able to assess asymmetry, range of motion, and tissue texture changes. It is necessary to have adequate visual capabilities for proper evaluation and treatment integration. Candidates and students must be able to observe the patient and the patient's responses, including body language and features of the examination and treatment. Pharmacy students must be able to read and interpret prescriptions, medical orders, and patient profiles, as well as to identify correct medication dosage and inspect medicine for deterioration or expiration.

Tactile

Candidates and students must have sufficient tactile ability for physical assessment. They must be able to perform palpation and functions of physical examination and/or those related to therapeutic intervention. Pharmacy students must be able to measure and compound, sometimes transferring from container to container, and to perform sterile procedures. The student must be able to use tactile senses to diagnose directly by palpation and indirectly by sensations transmitted through instruments, as well as have tactile ability sufficient for physical assessment.

Sensory

A student must be able to acquire information from written documents and to evaluate information presented as images from digital platforms, paper, films, slides, or video. A student must be able to benefit from electronic and other instrumentation that enhances visual, auditory, and somatic sensations needed for examination or treatment.

Behavioral and Social Attributes

Candidates and students must possess the emotional health required for full use of their intellectual abilities; the exercise of good judgment; the ability to take responsibility for their own actions with respect to policies, protocols, and processes—with faculty and staff members, students, patients, patient surrogates, and administration during the student's educational program; the prompt completion of all responsibilities attendant to the diagnosis, care, and treatment of patients; and the development of mature, sensitive, and effective relationships with the patients. Candidates and students must be able to physically tolerate taxing workloads, to adapt to changing environments, to display flexibility, and to learn to function in the face of uncertainties inherent in the clinical problems of many patients. Compassion, diversity inclusiveness, integrity, concern for others, interpersonal skills, interest, and motivation are all personal qualities that will be assessed during the admissions and education process.

Interprofessional Education (IPE)

NSU's Pharm.D. students are educated in a variety of interprofessional education settings with colleagues from other health care professions throughout their curriculum. The **Center of Interprofessional Education and Practice (CIPEP)** acts as the coordinating body for IPE, research, and practice at NSU. The overarching goal is to prepare students to be leaders in interprofessional, collaborative work environments. The university provides unique opportunities for exposure, immersion, and competency experiences throughout the curriculum.

First Professional Year: Students are introduced to the roles and responsibilities of the pharmacist on a patient-care team. In addition to the introduction of the roles of a pharmacist, students work alongside NSU MD students to work on cases, practicing their collaborative roles.

Second Professional Year: Students gain additional experience working alongside prescribers, specifically NSU MD students, to analyze increasingly complicated patient cases. Students will collaborate in interprofessional teams to identify medication-related problems, discuss potential consequences, and develop a plan to address those consequences.

Third Professional Year: During the final didactic year, students participate in the annual IPE Day experience, working alongside various health care professionals, including medical, nursing, dental, physical therapy, occupational therapy, optometry, and physician assistant students from multiple NSU campuses.

Fourth Professional Year: During the advanced pharmacy practice experiences, students collaborate with multiple health care professionals while providing team-based care. Students are evaluated on their competency to function as interprofessional team members in a variety of direct patient-care settings.

Financial Aid

The purpose of the Student Financial Assistance Program at Nova Southeastern University is to help as many qualified students as possible to complete their educational pursuits. Various loans, scholarships, and grants are available to qualified students and are described online at nova.edu/financialaid. Although most first-year pharmacy students will be classified as graduate students for financial aid purposes, students who matriculate with fewer than 90 semester hours and students in the dual-admission program will be classified as undergraduates for the first year in the BJSCOP.

Transfer Credits

Requests for transfer credit must be submitted in writing to the associate dean of the student's program. The request must include an official copy of the transcript containing the course title, final course grade, and a course syllabus.

In the Pharm.D. program, transfer credit will only be considered for courses taken at pharmacy schools accredited by the ACPE or for those courses given prior approval by the associate dean of the Professional Program. Up to, but no more than, four elective credit hours may be transferred from a regionally accredited graduate institution.

A minimum of 30 credit hours of didactic coursework and all Advanced Pharmacy Practice Experiences (APPE) must be completed at NSU. Transfer credits may not exceed 2/3 of the required credits to complete the degree program.

In the Ph.D. and M.S. in Pharmaceutical Sciences programs, a maximum of 6 credits may be transferred from a regionally accredited graduate institution. In the M.S. in Pharmaceutical Affairs program, a maximum of 3 credits may be transferred from a regionally accredited graduate program. Requests must be submitted in writing to the associate dean of the student's program.

For all programs, transfer credit will only be considered for courses designated with a graduate-level course number that were passed with a grade of *B* or better. Credit will not be transferred if previous credit was used to earn a degree from the granting institution. An official transcript from the institution attended must be provided before transfer credit will be awarded. All transfer credit requests must be received prior to August 1 of the first year of pharmacy school.

Official transcripts must be sent to Nova Southeastern University, Enrollment Processing Services, 3300 S. University Drive, PO Box 299000, Fort Lauderdale, FL 33328-2004. Electronic transcripts should be sent to electronictranscript@nova.edu.

Class Cancellation Policy

The university reserves the right to cancel any class.

Doctor of Pharmacy (Pharm.D.) Entry-Level Program

Admissions Requirements

The Barry and Judy Silverman College of Pharmacy selects students based on pre-pharmacy academic performance, test scores (optional), personal interviews, written applications, and letters of reference.

1. Prior to matriculation, all NSU Barry and Judy Silverman College of Pharmacy applicants must complete a minimum of 66 semester hours of coursework at a regionally accredited college or university, including the following required courses, with a minimum GPA of 2.0 on a 4.0 scale (2.75 preferred):

Course	Semester Hours
General Biology I and II (including laboratory)	8
Human Anatomy and Physiology I and II or Human Physiology I and II (with or without laboratory)	6
General Chemistry (including laboratory)	8
Organic Chemistry (including laboratory)	8
General Physics (with or without laboratory)	3
English	6
Calculus.....	3
Speech/Public Speaking/Oral Communication (in English).....	3
Advanced Sciences (Choose two courses of the following: genetics, cellular or molecular biology, microbiology, or biochemistry).....	6*
Humanities/Social and Behavioral Sciences/Other Electives	
Social and Behavioral Sciences	3
Humanities.....	3
Electives in either discipline.....	9**
TOTAL	66

* No two classes taken should be from the same discipline.

** Ethics, micro or macroeconomics, and general/life science statistics are highly recommended and may substitute for up to 9 humanities and social and behavioral sciences elective credits.

2. A minimum, cumulative GPA of 2.75 on a 4.0 scale is preferred.

3. A minimum science GPA of 2.3 and a minimum mathematics GPA of 2.0 on a 4.0 scale may be required or preferred, as explained below.

- The above GPAs **are required** for applicants who either have completed a minimum of 66 semester hours of prerequisites or are in progress of completing the prerequisites.
- The above GPAs **are preferred** for applicants who have a master's degree and have either completed prerequisites or are in progress of completing prerequisites.

4. Official scores from the Pharmacy College Admission Test (PCAT), or another admissions test, are optional. NSU BJSCOP

will accept scores from the following tests in place of the PCAT: GRE, MCAT, DAT, or OAT. Scores must be no more than three years old at the time of the applicant's interview.

5. Applicants must submit three letters of reference on official letterhead, with a signature, from two science professors and either a liberal arts professor, a pharmacist or health care professional, or a preprofessional committee member.

Application Procedures

Applicants apply for matriculation into the fall semester. The Office of Admissions processes applications on a rolling basis; therefore, it is in the best interest of the applicant to apply early. Listed below are the steps necessary to complete the application process.

1. Applicants must submit an electronic PharmCAS application. The interactive, web-based application is available at *PharmCAS.org*. The PharmCAS application process takes four to six weeks.

- application deadline: **May 1**

2. Applicants must submit the following materials to PharmCAS.

- official transcripts from all college and universities attended (submitted directly to PharmCAS by the college or university and/or foreign-credential evaluation service)
- three letters of reference
- official PCAT or other health-related admissions test scores (optional)

3. Proof of English proficiency is required for non-native English speakers. Scores for the following standardized tests* currently satisfy NSU's Barry and Judy Silverman College of Pharmacy English requirements:

- Test of English as a Foreign Language (TOEFL): minimum score of 80 on the Internet-based test or 213 on the computer-based test (*toefl.org*)
- International English Language Testing System (IELTS): minimum score of 6.0 on the test module (*ielts.org*)
- Duolingo Test of English: minimum score of 105 (*duolingo.com*)

* Scores must be no more than **two** years old at the time of the interview.

Candidates may also demonstrate English proficiency by successfully completing a baccalaureate, master's, or professional degree in the United States or two college-level English composition courses at a regionally accredited college or university with a minimum, cumulative GPA of 2.0 on a 4.0 scale.

Transfer Students

Candidates in good academic standing from their college /university of record may apply for consideration as a transfer student by

1. submitting a completed NSU electronic application with a nonrefundable application fee of \$50 (U.S.)
 - application deadline: June 1
2. meeting all entry-level or advanced-standing admissions requirements for NSU's BJSCOP, as applicable
3. submitting the following documentation
 - official transcripts for all college coursework
 - a written statement outlining the reasons for requesting the transfer
 - three letters of recommendation (two from pharmacy faculty members and one from the dean, associate dean, or assistant dean of the transferring college of pharmacy that indicate the student is in good standing within the current or most recent academic program)
4. completing an interview, if one is offered
5. submitting any official scores from standardized tests—such as PCAT, GRE, TOEFL, or IELTS—to help further the evaluation of applications and provide proof of English proficiency (optional, except for non-native English speakers)

Transfer credit will only be considered for courses designated with a graduate-level course number, passed with a grade of *B* or better, and transferred from a regionally accredited graduate institution. Credit used toward an earned degree will not be transferred. Requests for transfer credit must be submitted in writing to the associate dean of the student's program prior to August 1 of the year of matriculation. Transfer credits will not exceed 2/3 of the required credits to complete the degree program. A minimum of 30 credit hours of didactic coursework and all Advanced Pharmacy Practice Experiences (APPE) must be completed at NSU.

Note: Due to the design of the Pharm.D. curriculum, a transfer student may be required to enter as a first-year student.

Nondegree-Seeking Students

The college accepts nondegree-seeking students for travel study, study abroad, and some specific coursework. A nondegree-seeking student is one who does not intend to pursue a degree at the time of application. Nondegree-seeking students are not guaranteed future acceptance into the program. Contact phss@nova.edu for more information on this option.

Interview Process

A personal interview is part of the admissions process; however, being interviewed is not a guarantee of admission. Upon receipt of the completed application, a review will be made to determine if the applicant will be granted an interview. Not all applicants will be granted an interview. The Office of Admissions will notify selected applicants to schedule interviews.

Notice of Acceptance

Notice of acceptance or other action by the Committee on Admissions will be on a "rolling" or periodic schedule. Early completion of the application process is in the best interest of the applicant.

Admittance to the college is contingent upon successful completion of all prerequisite coursework prior to the first day of the semester. Proof of completion is required. A background check is required prior to matriculation. Refer to the background check section elsewhere in this catalog.

Transcripts

After acceptance, final and official transcripts from all colleges and universities attended, and/or final and official documents must be received within 90 calendar days from the start of the term. If these final and official transcripts and/or documents are not received by that time, the student will not be allowed to continue class attendance. In addition, financial aid will not be disbursed until a student provides all the necessary documents required to be fully admitted.

Foreign Coursework

Applicants who have completed coursework outside of the U.S. must request an official foreign evaluation report from World Education Services, Inc. Please request a course-by-course foreign transcript evaluation report (FTER), with an overall GPA calculation, sent directly from WES to PharmCAS.

- World Education Services, Inc.
(212) 966-6311 • 800-361-3106 • wes.org

- *By Postal Mail*
WES Reference #
WES Global Documentation Centre
PO Box 2008 STN MAIN
Newmarket, ON, L3Y 0G5
Canada

- *By Express Courier*
WES Reference #
WES Global Documentation Centre
14-145 Industrial Parkway South
Aurora, ON, L4G 3V5
Canada

In order to be fully admitted, applicants must submit all required admissions documents directly to NSU at the address below.

- Nova Southeastern University
Enrollment Processing Services
College of Pharmacy Admissions
3300 S. University Drive, PO Box 299000
Fort Lauderdale, FL 33328-2004

Program Requirements

All students must purchase an iPad or personal computer for assignments and assessments and have an active account with an Internet service provider. In addition, students must have ongoing access to a computer capable of connecting to the Internet and playing streaming video files. Online course notes and discussions will be provided to the student through an online course management system. Nova Southeastern University will provide access to email, online databases, and library resources.

Students must also provide their own transportation to experiential sites. It is recommended that all students have their own personal transportation, due to the inconsistency of reliable public transportation. Final-year students may be required to return to their respective campuses at designated times for live instruction, board exam preparation, and assessment.

International/Student Visa Information

It is the applicant's responsibility to contact the Office of International Students and Scholars for information on immigration regulations and student visa requirements at

- Nova Southeastern University
Attention: Office of International Students and Scholars
3300 S. University Drive
Fort Lauderdale, FL 33328-2004

(954) 262-7240
800-541-6682, ext. 27240
Fax: (954) 262-3846
Email: intl@nsu.nova.edu
nova.edu/internationalaffairs

Tuition: Entry-Level Program

All tuition and fees are subject to change by the board of trustees without notice.

Annual tuition will be posted online at pharmacy.nova.edu.

Fees, Expenses, and Deposit— All Programs

- Acceptance and Preregistration Deposit—\$1,000. This deposit is required to reserve the accepted applicant's place in the entering, first-year class. This deposit will be deducted from the tuition payment due on registration day, but is not

refundable in the event of a withdrawal. It is due within three weeks of an applicant's acceptance.

- Pharmacy General Access Fee—\$145 per annum.
- NSU Student Services Fee—\$1,800 per annum.
- Certification Fee—\$150 per certification.
- Late Payment Fee—All tuition and fees not paid within 30 days after the start of the semester will incur a \$100 late payment fee.
- BJSCOP Fees and Expenses—Additional fees will be incurred for national certifications, pharmacy testing, and other college-approved activities. These fees and expenses are estimated at \$1,000 over the course of the program.

The first semester's tuition and fees, less the nonrefundable, \$1,000 deposit, are due on or before the first day of classes. Tuition and fees for each subsequent semester are due on or before the first day of classes. Students will not be permitted to register or attend classes until their financial obligations have been met. The financial ability of applicants to complete their training at the college is important. Applicants should have specific plans for financing their professional education. This should include tuition, fees, iPad or personal computer, computer-related expenses, health insurance, books, printing, required equipment, and living and other miscellaneous expenses.

Each student is required to carry adequate personal medical and hospital insurance. For more information about NSU's required health insurance, visit the website at nova.edu/bursar/health-insurance.

Undergraduate/Pharm.D. Dual Admission Program

Nova Southeastern University Health Professions Division has established a Dual Admission Program with NSU's Halmos College of Arts and Sciences, Pontificia Universidad Católica de Puerto Rico, University of Puerto Rico en Aguadilla, and Universidad Central De Bayamon for a select number of highly motivated, qualified students interested in pursuing both an undergraduate education and professional studies in pharmacy. This allows students to receive their undergraduate Bachelor of Science degree and a Doctor of Pharmacy degree in a six- to eight-year period.

Candidates must maintain a minimum cumulative GPA of 3.0 on a 4.0 scale. Students will spend two to three years in the undergraduate school and then will be awarded a B.S. degree upon successful completion of the second/third year at Nova Southeastern University Barry and Judy Silverman College of Pharmacy. Students will receive the Doctor of Pharmacy degree after successfully completing the four-year Pharm.D. program at Nova Southeastern University College of Pharmacy.

For information and requirements for dual admission, contact one of the following:

- Office of Admissions
Halmos College of Arts and Sciences
Nova Southeastern University
3300 S. University Drive
Fort Lauderdale, FL 33328-2004
Phone: 800-541-6682
- Office of Admissions/Oficina de Admisiones
Pontificia Universidad Católica de Puerto Rico
2250 Boulevard Luis A. Ferré Aguayo
Suite 584
Ponce, Puerto Rico 00717-9997
Phone: (787) 841-2000, ext 1024
- Office of Admissions/Oficina de Admisiones
Universidad Central De Bayamon
P.O. Box 1725
Bayamon, PR 00960-1725
Phone: (787) 786-3060
- Office of Admissions/Oficina de Admisiones
Universidad de Puerto Rico en Aguadilla
P.O. Box 6150
Aguadilla, PR 00604-6150
Phone: (787) 890-2681, exts. 2280, 4431, or 6431

Pharmacy Intern Licensure

Upon matriculation, students are eligible to apply for pharmacy intern licensure. Licensure is a requirement for all NSU Pharm.D. students and for placement on pharmacy practice experiences. All students must have a valid U.S. Social Security number to apply for and receive the necessary pharmacy intern license(s). Without the appropriate intern license(s), a student cannot complete the curricular requirements.

Internship hours must be completed within the guidelines of the Florida Board of Pharmacy, as set forth in the Rule, Chapter 64B16-26 and by the Board of Pharmacy in any state in which the student plans to be licensed. The directors of experiential education will provide assistance and guidance to students regarding pharmacy practice experiences and earning required hours.

International students with questions regarding the validity of their visa for issuance of a Social Security number should contact the Office of International Students and Scholars by phone at (954) 262-7240 or 800-541-6682, extension 27240, or by email at intl@nova.edu.

Course of Study

NSU's Doctor of Pharmacy degree is awarded after successful completion of four years of professional study in the Barry and Judy Silverman College of Pharmacy. The curriculum stresses innovative teaching delivery and assessment methods.

The curriculum is designed so courses integrate information and build on one another in order to provide students with the knowledge and skills necessary to be successful in the profession. The curriculum uses active-learning components to improve critical thought process, reflective activity to stimulate professional growth, and experiential learning to optimize provision of patient-centered care.

Course content, teaching modalities, enhanced assessments, and incorporation of a block structure promote student learning and professional growth. The curricular design is based upon the **3 Ps**.

- Prepare knowledge in the classroom.
- Practice skills in the laboratory.
- Provide direct and indirect patient care in experiential activities.

Students complete required Introductory Pharmacy Practice Experiences (IPPEs) and Advanced Pharmacy Practice Experiences (APPEs) at community, hospital, and specialty health care sites in a variety of health care environments and systems, including direct and indirect patient care. Students are responsible for having reliable transportation (e.g., personal vehicle) to attend sites and may be required to secure accommodation at APPE sites away from their home locations. Prior to going on APPEs, students must successfully complete all didactic and elective courses, IPPEs, and assessments.

The evolution of the practice of pharmacy has increased the types and depth of care pharmacists provide to patients. The generalist practitioner must collect, analyze, synthesize, and communicate information relating to the selection and use of medication. Pharmacists who practice "at the top of their license" develop and refine skills and earn certificates in the latest standards of practice and patient safety. They may need to complete postgraduate residencies and specialty board certification for employment in hospitals.

Global Engagement

Opportunities for travel study, international APPEs, and medical outreach are available. Students must be preapproved to participate in college-sponsored, international programs.

Graduation Requirements—Entry Level

To receive a Pharm.D. degree, a student must fulfill the following requirements:

- be of good moral character
- successfully complete all curricular requirements and assessments within six academic years
- have a minimum cumulative GPA of 2.0 on a 4.0 scale
- satisfactorily fulfill all financial, library, and university obligations
- complete a minimum of 30 credit hours of didactic coursework and all APPEs at NSU BJSCOP, if transferring from another college of pharmacy
- submit to the registrar's office an application for degree/diploma by the posted deadline. Applications received after the deadline will not be considered for that year's commencement ceremony
- must attend the commencement ceremony in person
- receive approval by a Barry and Judy Silverman College of Pharmacy faculty vote

Entry-Level Curriculum Outline

These courses are representative of the overall requirements of the program at the time of publication. Updates to the curriculum will be posted online at pharmacy.nova.edu.

First Year—Fall/Winter Semesters			Credit Hours
PHRC	4810	Patient Care Basics	1
PHRC	4820	Biochemical Basis of Drug Therapy	3
PHRC	4830	Fundamentals of Pharmacodynamics	2
PHRC	4840	Dosage Forms and Drug Delivery	4
PHRC	4850	Pharmaceutical Calculations	2
PHRC	4861	Essentials of Professional Practice I	2
PHRC	4871	Evidence-Based Practice I	1
PHRC	4881	Leadership and Professional Development I	1
PHRL	4811	Pharmacy Skills Development I	1
PHRC	4891	Integrated Pharmacy Applications I	2
PHRC	4910	Nonprescription Drugs and Self-Care	3
PHRC	4921	Individualized Drug Therapy	4
PHRC	4931	Integrated Disease Management I	4
PHRC	4962	Essentials of Professional Practice II	2
PHRC	4972	Evidence-Based Practice II	2
PHRC	4982	Leadership and Professional Development II	1
PHRL	4912	Pharmacy Skills Development II	1
PHRC	4992	Integrated Pharmacy Applications II	2
Total First Year			38

Second Year—Fall/Winter Semesters			Credit Hours
PHRC	4990	IPPE: Community Pharmacy	4
PHRC	5832	Integrated Disease Management II	4
PHRC	5833	Integrated Disease Management III	4
PHRC	5863	Essentials of Professional Practice III	2
PHRC	5873	Evidence-Based Practice III	2
PHRC	5883	Leadership and Professional Development III	1
PHRL	5813	Pharmacy Skills Development III	1
PHRC	5893	Integrated Pharmacy Applications III	2
PHRC	5910	Immunology and Clinical Microbiology	2
PHRC	5934	Integrated Disease Management IV	3
PHRC	5935	Integrated Disease Management V	5
PHRC	5964	Essentials of Professional Practice IV	2
PHRC	5974	Evidence-Based Practice IV	2
PHRC	5984	Leadership and Professional Development IV	1
PHRL	5914	Pharmacy Skills Development IV	1
PHRC	5994	Integrated Pharmacy Applications IV	2
PHRE		Electives	4
Total Second Year			42

Third Year—Fall/Winter Semesters			Credit Hours
PHRC	5800	Patient and Physical Assessment	2
PHRC	5990	IPPE: Health Systems	4
PHRL	6810	Sterile Products Laboratory	1
PHRC	6836	Integrated Disease Management VI	4
PHRC	6837	Integrated Disease Management VII	3
PHRC	6838	Integrated Disease Management VIII	3
PHRC	6865	Essentials of Professional Practice V	3
PHRC	6875	Evidence-Based Practice V	2
PHRC	6885	Leadership and Professional Development V	1
PHRL	6815	Pharmacy Skills Development V	1
PHRC	6895	Integrated Pharmacy Applications V	2
PHRC	6920	Seminar	1
PHRE		Elective	2
PHRC	7700	Integrated Care	4
PHRC	77XX	APPE*	6
Total Third Year			33 (minimum)*

Fourth Year—Summer/Fall/Winter Semesters			Credit Hours
PHRC	7710	APPE: Internal Medicine*	6
PHRC	7720	APPE: Ambulatory Care*	6
PHRC	7730	APPE: Advanced Hospital*	6
PHRC	7740	APPE: Community Pharmacy*	6
PHRC	7750	APPE: Elective I*	6
PHRC	7760	APPE: Elective II*	6
PHRC	7770	APPE: Elective III*	6
PHRC	7801	Curricular Review I	1
PHRC	7802	Curricular Review II	1
PHRC	7803	Curricular Review III	2

Total Fourth Year 40 (minimum)*

Total Curriculum 159 (minimum)

**One APPE may be taken at the end of Year 3 and is not repeated in Year 4.*

Doctor of Pharmacy (Pharm.D.) Advanced Standing (International Pharmacy Graduates)

In an effort to meet the growing demands of the pharmacy profession, the Nova Southeastern University Barry and Judy Silverman College of Pharmacy (BJSCOP) provides an opportunity for international pharmacy graduates to enter the Pharm.D. program with advanced standing. Upon completion of the program, students are eligible to take the North American Pharmacy Licensing Examination (NAPLEX) and the Multistate Pharmacy Jurisprudence Examination (MPJE). This opportunity is designed exclusively for graduates of pharmacy degree programs outside of the United States jurisdiction, allowing them to build upon their pharmacy education and prepare them for clinical pharmacy practice.

The Advanced Standing Doctor of Pharmacy degree is awarded after successful completion of three years of professional study in the BJSCOP. The college educates students to achieve the same outcomes as the entry-level Pharm.D. degree program. Courses integrate information and build on one another to provide students with the knowledge and skills necessary to be successful in the profession and have a strong understanding of the principles of drug therapy, as well as the business, human relation, communication, and legal aspects of pharmacy and the U.S. health care system. Courses focus on application of material learned, the use of drugs in the disease process, and developing skills essential to monitoring drug therapy.

Pharmacy practice experiences occur in community, hospital, and specialty health care sites in a variety of health care environments and systems, including direct and indirect patient care.

The curriculum stresses innovative delivery and assessment methods. All lectures, handouts, reading materials, and assessments will be in English.

Admissions Requirements

NSU's Barry and Judy Silverman College of Pharmacy selects international pharmacy graduates for the program based on previous academic performance, GRE scores (optional), TOEFL/IELTS/Duolingo scores (required of non-native English speakers), written applications, pharmacy experience, and letters of reference.

1. Prior to matriculation, applicants must have an earned Bachelor of Pharmacy degree or a Bachelor of Science degree in Pharmacy from a regionally accredited institution or the equivalent. The college will evaluate all official transcripts to determine if the student has successfully completed the courses listed with a grade of C or higher.

Course	Semester Hours
Human Anatomy and/or Physiology (with or without laboratory)	3-6
Biochemistry	3-6
Microbiology	3-6
Pharmaceutics.....	3-6
Pharmacokinetics	3-6
Pharmacology	3-6

The college may require applicants to complete additional prerequisite courses in order to strengthen their academic backgrounds.

2. A minimum cumulative GPA of 2.75 on a 4.0 scale on all college-level coursework is recommended.

3. An official course-by-course evaluation of foreign coursework with the cumulative grade point average included (see under application procedures for further details) is required.

4. Proof of English proficiency is required for non-native English speakers. Scores for the following standardized tests* currently satisfy NSU's Barry and Judy Silverman College of Pharmacy English requirements:

- Test of English as a Foreign Language (TOEFL): minimum score of 80 on the Internet-based test or 213 on the computer-based test (toefl.org)
- International English Language Testing System (IELTS): minimum score of 6.0 on the test module (ielts.org)
- Duolingo Test of English: minimum score of 105 (duolingo.com)

** Scores must be no more than **two** years old at the time of the interview.*

Candidates who have taken college courses in the United States may also prove English proficiency by successfully completing two college-level English composition courses at a regionally accredited college or university in the United States with a minimum cumulative GPA of 2.0 on a 4.0 scale.

5. Applicants must submit three letters of reference on official letterhead, with a signature, from two science professors and either a liberal arts professor, a pharmacist or health care professional, or a preprofessional committee member.

6. Applicants who graduated from pharmacy school 10 or more years prior must have either

- taken two upper-level (3000- or 4000-level) science courses or one upper-level science course and one upper-level statistics course at a regionally accredited college or university in the United States within the last 10 years

OR

- practiced as a licensed pharmacist for greater than 50 percent of the time since pharmacy school graduation (proof of licensed pharmacist employment, including dates and position[s] held, must be provided via a letter of recommendation from the applicant's employer)

It is strongly recommended that applicants also submit official scores from the Graduate Record Examination (GRE) and/or the Pharmacy College Admission Test (PCAT).

Application Procedures

Applicants apply for matriculation into the summer semester. The Office of Admissions processes applications on a "rolling" basis; therefore, it is in the best interest of the applicant to apply early. Listed below are the steps necessary to complete the application process.

1. Applicants must submit an electronic PharmCAS application. The interactive, web-based application can be accessed through *PharmCAS.org*. The PharmCAS application process takes four to six weeks.

- application deadline: **May 1**

2. Applicants must submit the materials listed following to PharmCAS.

- Foreign evaluations and official transcripts from all colleges and universities attended must be submitted directly to PharmCAS by the college or university or by World Education Services, Inc. Applicants who have taken coursework outside the U.S., please see Foreign Coursework section on this page for further instructions.
- PCAT or other standardized exams scores are optional. Applicants who have taken TOEFL or IELTS exams should send them directly to PharmCAS. Duolingo scores should be emailed to *pharmacyadmissions@nova.edu*.
- Applicants should send letters of recommendation directly to PharmCAS. All letters should be on proper letterhead and signed with a pen.

Interview Process

A personal interview is part of the admissions process; however, being interviewed is not a guarantee of admission. Upon receipt of the completed application, a review will be made to determine if the applicant will be granted an interview. Not all applicants will be granted an interview. The Office of Admissions will notify selected applicants to schedule interviews.

Notice of Acceptance

Notice of acceptance or other action by the Committee on Admissions will be on a "rolling" or periodic schedule. Early completion of the application process is in the best interest of the applicant. Admittance to the college is contingent upon

successful completion of all prerequisite coursework prior to the first day of the semester. Proof of completion is required.

Transcripts

After acceptance, final and official transcripts from all colleges and universities attended, and/or final and official documents, must be received within 90 calendar days from the start of the term. If these final and official transcripts and/or documents are not received by that time, the student will not be allowed to continue class attendance. In addition, financial aid will not be disbursed to students until all their necessary documents required to be fully admitted have been provided.

Foreign Coursework

Applicants who have completed coursework outside of the U.S. must request an official foreign evaluation report from World Education Services, Inc. Please request a course-by-course foreign transcript evaluation report (FTER), with an overall GPA calculation, sent directly from WES to PharmCAS.

- World Education Services, Inc.
(212) 966-6311 • 800-361-3106 • *wes.org*

- *By Postal Mail*
WES Reference #
WES Global Documentation Centre
PO Box 2008 STN MAIN
Newmarket, ON, L3Y 0G5
Canada

- *By Express Courier*
WES Reference #
WES Global Documentation Centre
14-145 Industrial Parkway South
Aurora, ON, L4G 3V5
Canada

It is the applicant's responsibility to have this coursework evaluated. An official course-by-course evaluation with a cumulative grade point average must be sent directly to PharmCAS or Nova Southeastern University.

3. In order to be fully admitted, applicants must submit all required admissions documents directly to NSU's Enrollment Processing Service at the address below.

- Nova Southeastern University
Enrollment Processing Service
College of Pharmacy Admissions
3300 S. University Drive, PO Box 299000
Fort Lauderdale, FL 33328-2004

Program Requirements

All students must purchase an iPad or personal computer for assignments and assessments and have an active account with an Internet service provider. In addition, students must have ongoing access to a computer capable of connecting to the Internet and playing streaming video files. Online course notes and discussions will be provided to the student through an online

course management system. Nova Southeastern University will provide access to email, online databases, and library resources.

It is recommended that all students have their own personal transportation, due to the inconsistency of reliable public transportation. Final-year students may be required to return to their respective campuses at designated times for live instruction, board exam preparation, and assessment.

Tuition: Advanced Standing Program
All tuition and fees are subject to change by the board of trustees without notice.

Annual tuition will be posted online at pharmacy.nova.edu.

**Fees, Expenses, and Deposit—
All Programs**

- Acceptance and Preregistration Deposit—\$1,000. This deposit is required to reserve the accepted applicant's place in the entering, first-year class. This deposit will be deducted from the tuition payment due on registration day, but is not refundable in the event of a withdrawal. It is due within three weeks of an applicant's acceptance.
- Pharmacy General Access Fee—\$145 per annum.
- NSU Student Services Fee—\$1,800 per annum.
- Certification Fee—\$150 per certification.
- Late Payment Fee—All tuition and fees not paid within 30 days after the start of the semester will incur a \$100 late fee.
- BJSCOP Fees and Expenses—Additional fees and expenses will be incurred for national certifications, pharmacy testing, and other college-approved activities. These fees and expenses are estimated at \$1,000 over the course of the program.

The first semester's tuition and fees, less the nonrefundable, \$1,000 deposit, are due on or before registration day. Tuition for each subsequent semester is due on or before the appropriate registration day. Students will not be permitted to register until their previous financial obligations have been met. The financial ability of applicants to complete their training at the college is important. Applicants should have specific plans for financing their professional education. This should include tuition, fees, iPad or personal computer, computer-related expenses, health insurance, books, printing, required equipment, and living and other miscellaneous expenses.

Each student is required to carry adequate personal medical and hospital insurance. For more information about NSU's required health insurance, visit the website at nova.edu/bursar/health-insurance.

International/Student Visa Information

It is the applicant's responsibility to contact the Office of International Students and Scholars for information on immigration regulations and student visa requirements at

- Nova Southeastern University
Attention: Office of International Students and Scholars
3300 S. University Drive
Fort Lauderdale, FL 33328-2004

(954) 262-7240
800-541-6682, ext. 27240
Fax: (954) 262-3846
Email: intl@nsu.nova.edu
nova.edu/internationalaffairs

Pharmacy Intern Licensure

Upon matriculation, students are eligible to apply for pharmacy intern licensure. Licensure is a requirement for all NSU Pharm.D. students and for placement on pharmacy practice experiences. All students must have a valid U.S. Social Security number to apply for and receive the necessary pharmacy intern license(s). Without the appropriate intern license(s), a student cannot complete the curricular requirements.

Internship hours must be completed within the guidelines of the Florida Board of Pharmacy, as set forth in the Rule, Chapter 64B16-26 and by the Board of Pharmacy in any state in which the student plans to be licensed. The directors of experiential education will provide assistance and guidance to students regarding pharmacy practice experiences and earning required hours.

International students with questions regarding the validity of their visa for issuance of a Social Security number should contact the Office of International Students and Scholars by phone at (954) 262-7240 or 800-541-6682, extension 27240, or by email at intl@nova.edu.

**Graduation Requirements—
Advanced Standing**

Graduation requirements for students in the Advanced Standing Doctor of Pharmacy degree program are the same as the entry-level Pharm.D. program, except advanced standing students must successfully complete all curricular requirements and assessments within five academic years.

Advanced Standing Curriculum Outline

These courses are representative of the overall requirements of the program at the time of publication. Updates to the curriculum will be posted online at pharmacy.nova.edu.

First Year—Summer Semester			Credits
PHRC	5811	Foundations of Pharmacy I	2
PHRC	5812	Foundations of Pharmacy II	5
Total			7

First Year—Fall/Winter Semesters			Credits
PHRC	4990	IPPE: Community Pharmacy	4
PHRC	5813	Foundations of Pharmacy III	2
PHRC	5832	Integrated Disease Management II	4
PHRC	5833	Integrated Disease Management III	4
PHRC	5863	Essentials of Professional Practice III	2
PHRC	5873	Evidence-Based Practice III	2
PHRC	5883	Leadership and Professional Development III	1
PHRC	5893	Integrated Pharmacy Applications III	2
PHRL	5813	Pharmacy Skills Development III	1
PHRC	5910	Immunology and Clinical Microbiology	2
PHRC	5934	Integrated Disease Management IV	3
PHRC	5935	Integrated Disease Management V	5
PHRC	5964	Essentials of Professional Practice IV	2
PHRC	5974	Evidence-Based Practice IV	2
PHRC	5984	Leadership and Professional Development IV	1
PHRL	5914	Pharmacy Skills Development IV	1
PHRC	5994	Integrated Pharmacy Applications IV	2
Total First Year			47

Second Year—Fall/Winter Semesters			Credits
PHRC	5800	Patient and Physical Assessment	2
PHRC	5990	IPPE: Health Systems	4
PHRL	6810	Sterile Products Laboratory	1
PHRC	6836	Integrated Disease Management VI	4
PHRC	6837	Integrated Disease Management VII	3
PHRC	6838	Integrated Disease Management VIII	3
PHRC	6865	Essentials of Professional Practice V	3
PHRC	6875	Evidence-Based Practice V	2
PHRC	6885	Leadership and Professional Development V	1
PHRL	6815	Pharmacy Skills Development V	1
PHRC	6895	Integrated Pharmacy Applications V	2
PHRC	6920	Seminar	1
PHRE		Elective	2
PHRC	7700	Integrated Care	4
PHRC	77XX	APPE*	6

Total Second Year 33 (minimum)*

Third Year—Summer/Fall/Winter Semesters			Credits
PHRC	7710	APPE: Internal Medicine*	6
PHRC	7720	APPE: Ambulatory Care*	6
PHRC	7730	APPE: Advanced Hospital*	6
PHRC	7740	APPE: Community Pharmacy*	6
PHRC	7750	APPE: Elective I*	6
PHRC	7760	APPE: Elective II*	6
PHRC	7770	APPE: Elective III*	6
PHRC	7801	Curricular Review I	1
PHRC	7802	Curricular Review II	1
PHRC	7803	Curricular Review III	2

Total Third Year 40 (minimum)*

Total Curriculum 126 (minimum)

*One APPE may be taken at the end of Year 2 and is not repeated in Year 3.

Pharm.D. Course Descriptions

Note: Listed at the end of each entry are lecture hours, laboratory hours, and credit hours.

PHRC 4810—Patient Care Basics

This course provides students with an introductory toolkit to providing patient-centered care. It introduces students to the Pharmacists' Patient Care Process and its role in delivering consistent patient-care services. The pharmacist's role in the Medication-Use Process is explored and the use of information technology and quality measures in these processes are addressed. Basic patient-care skills of vital sign assessment, point-of-care testing, interpretation of medical and pharmacy terminology, and laboratory values are introduced and social, behavioral, and communication factors impacting patient care are discussed. **(16-0-1)**

PHRL 4811—Pharmacy Skills Development I

This is the first of a five-course pharmacy skills development series that integrates principles of pharmaceutical sciences; pharmacy practice; and social, behavioral, and administrative pharmacy. Students will apply knowledge and practice skills complementary to content in the first semester of the curriculum. Skills practiced include written and verbal communication, pharmacy calculations, application of basic knowledge of commonly used medications, identification of medication errors, verification of orders, and drug information retrieval and provision. Team-building activities are incorporated throughout the course to enhance professionalism and communication skills. **(0-48-1)**

PHRC 4820—Biochemical Basis of Drug Therapy

This course focuses on the structure and function of vitamins, carbohydrates, proteins, hormones, nucleic acids, and lipids, as well as bioenergetics and major catabolic pathways at the cellular level. It establishes the biochemical basis for cell structure and emphasizes an integrated approach to the understanding of cellular metabolism; provides a biochemical, genetic, and molecular basis for understanding disease and drug functioning; and examines the mechanisms for genetic information flow in prokaryotic and eukaryotic cells. **(48-0-3)**

PHRC 4830—Fundamentals of Pharmacodynamics

This course applies the concepts of organic chemistry to help students understand drug action at the molecular level. It introduces students to basic pharmacological principles that explain drug effects as they pertain to mechanisms of action and drug disposition into different organs and tissues. In addition, this course describes drug actions at physiological receptors focusing on compounds that act on the autonomic nervous system. **(32-0-2)**

PHRC 4840—Dosage Forms and Drug Delivery

This course integrates basic anatomical and physiological features of various routes of administrations, drug and excipients physicochemical characteristics, and biopharmaceutical principles into the design and formulation of various conventional pharmaceutical dosage forms. It emphasizes the drug approval processes and regulatory standards. The course explores in detail most pharmaceutical dosage forms, their characteristics and uses, formulation composition and requirements, manufacturing methods and compendial testing, and packaging. **(64-0-4)**

PHRC 4850—Pharmaceutical Calculations

This course introduces the common systems of measurement and mathematical principles used in the traditional practice of pharmacy. Emphasis is also placed on calculations relevant to specific dose regimens based on patient specific clinical parameters. Competencies developed throughout the course shall prepare students to accurately analyze and solve real-life pharmaceutical problems involving calculations used in the preparation and dispensing of pharmaceutical preparations. **(32-0-2)**

PHRC 4861—Essentials of Professional Practice I

This is the first of a five-course sequence that prepares the student to develop the knowledge and problem-solving skills needed to become a practice-ready professional who can apply concepts to manage the quality and safety of the Medication-Use Process and deliver patient-centered care. This course addresses laws that govern the pharmacist's scope of practice and the foundation for effective patient communication. **(32-0-2)**

PHRC 4871—Evidence-Based Practice I

This is the first of a five-course sequence that prepares the student to retrieve, evaluate, and use the medical and scientific literature and other drug information resources. It is designed to prepare students to apply drug information skills for the delivery of patient-centered care using evidence-based principles to improve outcomes. Students learn the strengths and weaknesses of the various references and how to apply their use in practice. Active learning experiences include retrieving scientific literature, utilizing electronic resources, performing literature searches, and formulating responses to basic drug information requests. **(16-0-1)**

PHRC 4881—Leadership and Professional Development I

This is the first in a series of five courses that focus on personal and professional development. This course introduces strategies for self-evaluation, goal setting, providing feedback, effective intra- and interprofessional teamwork, and ethical and professional behavior. Students develop professional goals and

create a professional biography. Curriculum and cocurriculum experiences stimulating student growth are documented and tracked through the electronic portfolio. **(16-0-1)**

PHRC 4891—Integrated Pharmacy Applications I

This is the first in a series of five courses offered at the end of each semester designed to integrate and apply knowledge and skills from previous courses. The “Bring Back” section of the course will reinforce foundational concepts from the fall semester, including pharmaceutical calculations, commonly used drugs, and pharmacy law. The “Look Forward” section of the course introduces material to prepare students for future courses, including basic patient assessment and self-care concepts, as well as practical applications of pharmacokinetics. Additionally, in each course, students will have the opportunity to receive specialized training and earn certification in a specific area of pharmacy practice. This course offers certification in immunization. **(32-0-2)**

PHRC 4910— Nonprescription Drugs and Self-Care

This course is designed to familiarize the student with the principles and theories of self-care, nonprescription medications, medical devices, and home-testing kits commonly found in community pharmacy practice. The pharmacist’s role in self-care is explored and students apply the Pharmacists’ Patient Care Process in solving patient-care cases. It approaches medical conditions by focusing on typical presenting signs and symptoms. For each condition, students explore the basic causes, signs, and symptoms; basic self-care guidelines; and when to refer patients. Emphasis is placed on problem-solving processes involved in the therapeutic evaluation, rational use, and recommendation of treatment to patients. Topics include dermatological, respiratory, ophthalmic, otic, oral, gastrointestinal, and genital-urinary disorders. A very strong emphasis is placed on patient care and patient counseling. **(48-0-3)**

PHRL 4912—Pharmacy Skills Development II

This is the second of a five-course pharmacy skills development series that integrates principles of pharmaceutical sciences, social and behavioral pharmacy, and pharmacy practice. In this course, students apply knowledge and practice skills complementary to content in the second semester of the curriculum. Skills practiced include written and verbal communication, compounding of nonsterile formulations, pharmacy calculations, application of basic knowledge of commonly used medications, identification of errors, verification of orders, and drug information retrieval and provision. Team-building activities are incorporated throughout the course to enhance professionalism and communication skills. **(0-48-1)**

PHRC 4921—Individualized Drug Therapy

This course explores the individualization of drug therapy. It provides students with the foundation in pharmacokinetic concepts and application. The principles involved in drug absorption, distribution, metabolism, and elimination in the human body are discussed and mechanisms and rates of these processes are studied. The influence of physiologic and biochemical process on the fate of drugs in the body are explored and pharmacokinetic principles are applied in the therapeutic monitoring of drugs. This course also provides students with a foundation on pharmacogenomic concepts. **(64-0-4)**

PHRC 4931—Integrated Disease Management I

This is the first in a series of eight courses that integrates the principles of pathophysiology, pharmaceuticals, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to appropriately select, and monitor pharmacotherapy regimens based on drug, disease, and patient characteristics and apply the Pharmacists’ Patient Care Process in solving patient-care cases. This course focuses on women’s health, urology, gastrointestinal and endocrine disorders, obesity, and dyslipidemias. **(64-0-4)**

PHRC 4962—Essentials of Professional Practice II

This is the second of a five-course sequence that prepares the student to develop the knowledge and problem-solving skills needed to become a practice-ready professional who can apply the concepts to manage the quality and safety of the medication use process and deliver patient-centered care. This course provides an overview of health care systems. It emphasizes a population and public health perspective, health economics as a complement to public health, health care financing, and basic concepts of health care ethics. **(32-0-2)**

PHRC 4972—Evidence-Based Practice II

This is the second of a five-course sequence that prepares the student to retrieve, evaluate, and use the medical and scientific literature and other drug information resources. This course is designed to expose students to the fundamentals of research design and methodology and applied biostatistical data analysis. It focuses on familiarizing students with general methodologic approaches used in experimental design, statistical analysis of data, investigator’s responsibilities, ethical considerations in research, protection of human subjects, and institutional review boards (IRBs). **(32-0-2)**

PHRC 4982—Leadership and Professional Development II

This is the second in a series of five courses that focus on personal and professional development. This course focuses on developing professional attitudes, behaviors, and ethics. It explores facilitators and barriers to interprofessional interactions and addresses the role of the pharmacist in advocating for patients and the profession. Teamwork

is reinforced through team-based learning. Curriculum and cocurricular activities stimulating student growth are documented and tracked through the electronic portfolio. **(16-0-1)**

PHRC 4990—Introductory Pharmacy Practice Experience: Community Pharmacy

This 160-hour, out-of-classroom, supervised, outpatient experience highlights the operations and practice management aspects of community pharmacy practice. The experience is designed to introduce students to the Medication-Use Process, patient and health care provider communication, and outpatient health care delivery. Emphasis is placed on medication dispensing; patient counseling; pharmacy policy/procedure; application of local, state, and federal regulations; and exploration of the community pharmacist's approach to patient care. Students will participate in all applicable pharmacy operations and patient-care activities, reply to drug information questions, complete projects, and participate in topic discussions. **(0-160-4)**

PHRC 4992—Integrated Pharmacy Applications II

This is the second in a series of five courses offered at the end of each semester designed to integrate and apply knowledge and skills from previous courses. Students in each course become certified in a specific area of pharmacy and receive software training. The Bring Back and Look Forward sections of the course series reinforce concepts and introduce material to prepare students for future courses. This course offers certification in tobacco cessation counseling through Rx for Change. It brings back pharmacokinetics calculations, frequently used drugs, and integrated disease management cases. It reviews expectations for experiential courses in preparation for the Introductory Pharmacy Practice Experience (IPPE): Community Pharmacy course. **(32-0-2)**

PHRC 5800—Patient and Physical Assessment

This course provides students with the knowledge and skills necessary to perform comprehensive patient assessments utilizing the skills of history taking, inspection, palpation, percussion, auscultation, and specimen extraction to conduct point-of-care testing. Charting, interpretation of findings, and evaluation of common clinical conditions—especially as related to medications—are integrated into these activities. The course emphasizes the first two steps of the Pharmacists' Patient Care Process: *Collect* and *assess*, and is taught using a combination of self-study and laboratory sections that allow students to practice and demonstrate acquired skills. **(16-48-2)**

PHRC 5811—Foundations of Pharmacy I

This is the first in a series of three foundational courses that provide the basis for pharmacist patient-centered care. The courses integrate concepts from pharmaceutical sciences, sociobehavioral and administrative pharmacy, and pharmacy practice. This comprehensive, blended course addresses basic

concepts of human nutrition, disease-state management of gastrointestinal disorders, nonprescription medications and self-care skills, and the literature resources used to provide evidence-based care. Problem-solving skills are emphasized by applying the Pharmacists' Patient Care process. **(32-0-2)**

PHRC 5812—Foundations of Pharmacy II

This is the second in a series of three foundational courses that provide the basis for pharmacist patient-centered care. The courses integrate concepts from pharmaceutical sciences, sociobehavioral and administrative pharmacy, and pharmacy practice. This comprehensive, blended course addresses pharmacy calculations, pharmacokinetics, healthcare systems, interprofessional collaboration, laws governing the pharmacist's scope of practice, ethics in professional practice, health disparities and disease-state management of lipid disorders, obesity, diabetes mellitus, and genitourinary and women's health disorders. Problem-solving skills are emphasized using pharmaceutical calculations and applying the Pharmacists' Patient Care process. **(60-20-5)**

PHRC 5813—Foundations of Pharmacy III

This is the third in a series of three foundational courses that provide the basis for pharmacist patient-centered care. This course incorporates the principles of pathophysiology, pharmaceutics, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to appropriately select and monitor pharmacotherapy regimens based on drug, disease, and patient characteristics and apply the Pharmacists' Patient Care Process in solving patient-care cases. The course focuses on fluid and electrolytes; acid-base balance; anemias; and renal, hepatic, and clotting disorders. **(32-0-2)**

PHRL 5813—Pharmacy Skills Development III

This is the third of a five-course pharmacy skills development series that integrates principles of pharmaceutical sciences, social and behavioral pharmacy, and pharmacy practice. Students will apply knowledge and practice skills complementary to content in the third semester of the curriculum. Skills practiced include written and verbal communication; pharmacy calculations; application of knowledge of commonly used medications; identification of medication errors; verification of orders; drug information retrieval, evaluation, and provision; patient assessment; and selection and monitoring of pharmacotherapy patient-care plans. Team-building activities are incorporated throughout the course to enhance professionalism and communication skills. **(0-48-1)**

PHRC 5832—Integrated Disease Management II

This is the second in a series of eight courses that integrates the principles of pathophysiology, pharmaceutics, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to

appropriately select and monitor pharmacotherapy regimens based on drug, disease, and patient characteristics and apply the Pharmacists' Patient Care Process in solving patient-care cases. The course focuses on the treatment of cardiovascular diseases. **(64-0-4)**

PHRC 5833—Integrated Disease Management III

This is the third in a series of eight courses that integrates the principles of pathophysiology, pharmaceuticals, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to appropriately select and monitor pharmacotherapy regimens based on drug, disease, and patient characteristics and apply the Pharmacists' Patient Care Process in solving patient-care cases. This course focuses on women's health, urology, respiratory conditions, GI, endocrine, and nutrition. **(64-0-4)**

PHRC 5863—Essentials of Professional Practice III

This is the third of a five-course sequence that prepares the student to develop the knowledge and problem-solving skills needed to become a practice-ready professional who can apply concepts to manage the quality and safety of the medication-use process and deliver patient-centered care. This course addresses advanced patient communication, patient health education, finance, resource management, and pharmaceutical marketing concepts. **(32-0-2)**

PHRC 5873—Evidence-Based Practice III

This is the third of a five-course sequence that prepares the student to retrieve, evaluate, and use the medical and scientific literature and other drug information resources. It introduces pharmacoepidemiology and applies the fundamentals of biostatistics, research design, and methodology to evaluate scientific and medical literature. **(32-0-2)**

PHRC 5883—Leadership and Professional Development III

This is the third in a series of five courses that focus on personal and professional development. This course emphasizes personality awareness, career pathways, networking, professional goal setting and planning, innovative mindset, and disruption in pharmacy practice. Students will assess and reflect on their personality characteristics and career pathway preferences. They will create a LinkedIn profile and résumé, update their professional goals, and start their professional development plan. Teamwork is reinforced through peer evaluation and team-based learning. Curriculum and cocurricular activities stimulating student growth are tracked through the electronic portfolio. **(16-0-1)**

PHRC 5893—Integrated Pharmacy Applications III

This is the third in a series of five courses offered each semester designed to integrate and apply knowledge and skills from previous courses. The Bring Back and Look Forward sections of the course reinforce concepts and introduce material to prepare students for future courses. It brings back pharmacotherapy

cases and topics in drug literature evaluation, medication adherence, health literacy, and motivational interviewing. It introduces basics of pharmacoeconomics in preparation for the Evidence-Based Practice course series that follows. **(24-8-2)**

PHRC 5910—Immunology and Clinical Microbiology

This course introduces the fundamentals of immunology, microbiology, and pharmacology of anti-infective agents. It prepares students for the Integrated Disease Management course series in infectious and immunologic diseases that follow. Topics covered include an introduction to the body's immune response and mechanisms of defense at the cellular and humoral level. The classification, morphology, and physiology and mechanisms of virulence of microorganisms that primarily cause human pathology—such as bacteria, viruses, fungi, and protozoans—will also be covered. Therapeutic agents used to treat bacterial infections are introduced. **(32-0-2)**

PHRL 5914—Pharmacy Skills Development IV

This is the fourth of a five-course, pharmacy skills development series that integrates principles of pharmaceutical sciences; pharmacy practice; and social, behavioral, and administrative pharmacy. In this course, students apply knowledge and practice skills complementary to content in the fourth semester of the curriculum. Skills practiced include written and verbal communication; pharmacy calculations; application of knowledge of commonly used medications; identification of medication errors; verification of orders; drug information retrieval, evaluation, and provision; patient assessment; and selection and monitoring of pharmacotherapy patient-care plans. Team-building activities are incorporated throughout the course to enhance professionalism and communication skills. **(0-48-1)**

PHRC 5934—Integrated Disease Management IV

This is the fourth in a series of eight courses that integrates the principles of pathophysiology, pharmaceuticals, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to appropriately select and monitor pharmacotherapy regimens based on drug, disease, and patient characteristics and apply the Pharmacists' Patient Care Process in solving patient-care cases. This course focuses on the treatment of diseases of the immune system. **(48-0-3)**

PHRC 5935—Integrated Disease Management V

This is the fifth in a series of eight courses that integrate the principles of pathophysiology, pharmaceuticals, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to appropriately select and monitor pharmacotherapy regimens based on drug, disease, and patient characteristics and apply the Pharmacists' Patient Care Process in solving patient-care

cases. This course focuses on the treatment of infectious diseases. **(80-0-5)**

PHRC 5964—Essentials of Professional Practice IV

This is the fourth of a five-course sequence that prepares the student to develop the knowledge and problem-solving skills needed to become a practice-ready professional who can apply concepts to manage the quality and safety of the Medication-Use Process and deliver patient-centered care. This course addresses the quality instantiates and the management of hospital and community pharmacies and explores different pharmacy practice models. **(32-0-2)**

PHRC 5974—Evidence-Based Practice IV

This is the fourth of a five-course sequence that prepares the student to retrieve, evaluate, and use the medical and scientific literature and other drug information resources. This course exposes students to data analytics and an “abbreviated” scientific process by planning, developing, and presenting a simple research project using the National Health and Nutrition Examination Survey (NHANES) database as a data source. The application of data analytics in health informatics will also be discussed. **(32-0-2)**

PHRC 5984—Leadership and Professional Development IV

This is the fourth in a series of five courses that focus on personal and professional development. This course focuses on the development of leadership skills and collaboration among members of intra- and interprofessional teams. Teamwork is reinforced through team-based learning. Curriculum and cocurricular activities stimulating student professional growth are documented and tracked through the electronic portfolio. **(16-0-1)**

PHRC 5990—Introductory Pharmacy Practice Experience: Health Systems

This 160-hour, out-of-classroom, supervised, inpatient experience highlights the operations and practice management aspects of health systems pharmacy practice. The experience is designed to introduce students to medication-use processes, patient and health care provider communication, inpatient health care delivery, and the role of the pharmacist in this setting. Emphasis is placed on medication dispensing; drug procurement/inventory control; application of institutional pharmacy policy/procedure; and local, state, and federal regulations. Students participate in all applicable pharmacy operations and patient-care activities, reply to drug information questions, complete projects, and participate in topic discussions. **(0-160-4)**

PHRC 5994—Integrated Pharmacy Applications IV

This is the fourth in a series of five courses offered at the end of each semester designed to integrate and apply knowledge and skills from previous courses. The Bring Back and Look Forward sections of the course reinforce previously taught

concepts and introduce material to prepare students for future courses. This course brings back pharmaceutical and pharmacokinetics calculations, frequently used drugs, pharmacy management applications, and pharmacotherapy cases. It introduces concepts to prepare students to continue the Integrated Disease Management, Essentials of Professional Practice, and Evidence-Based Practice course series. It reviews expectations for experiential courses in preparation for the Introductory Pharmacy Practice Experience: Health Systems course. **(32-0-2)**

PHRL 6810—Sterile Products Laboratory

This laboratory course is designed to develop the knowledge and skills necessary to prepare sterile products safely and effectively. Students will learn the history and evolution of aseptic processing and the current regulations and standards of practice that guide sterile preparation. The course is taught using a combination of self-study and a laboratory component that allows students to apply the fundamental concepts and skills required for the safe and compliant compounding of sterile products in a cleanroom. **(0-48-1)**

PHRL 6815—Pharmacy Skills Development V

This is the fifth of a five-course, pharmacy skills development series that integrates principles of pharmaceutical sciences; pharmacy practice; and social, behavioral, and administrative pharmacy. In this course, students apply knowledge and practice skills complementary to content in the fifth semester of the curriculum. Skills practiced include written and verbal communication; pharmacy calculations; application of knowledge of commonly used medications; identification of medication errors; verification of orders; drug information retrieval, evaluation, and provision; patient assessment; and selection and monitoring of pharmacotherapy patient-care plans. Team-building activities are incorporated throughout the course to enhance professionalism and communication skills. **(0-48-1)**

PHRC 6836—Integrated Disease Management VI

This is the sixth in a series of eight courses that integrate the principles of pathophysiology, pharmaceuticals, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to appropriately select and monitor pharmacotherapy regimens based on drug, disease, and patient characteristics and apply the Pharmacists’ Patient Care Process in solving patient-care cases. This course focuses on neurologic and psychiatric disorders. **(64-0-4)**

PHRC 6837—Integrated Disease Management VII

This is the seventh in a series of eight courses that integrate the principles of pathophysiology, pharmaceuticals, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to appropriately select and monitor pharmacotherapy regimens

based on drug, disease, and patient characteristics and apply the Pharmacists' Patient Care Process in solving patient-care cases. This course focuses on clinical toxicology, pain management, substance abuse, and attention-deficit/hyperactivity disorder. **(48-0-3)**

PHRC 6838—Integrated Disease Management VIII

This is the eighth in a series of eight courses that integrate the principles of pathophysiology, pharmaceuticals, pharmacodynamics, pharmacokinetics, and pharmacotherapy in the treatment of diseases. Students learn how to appropriately select and monitor pharmacotherapy regimens based on drug, disease, and patient characteristics and apply the Pharmacists' Patient Care Process in solving patient-care cases. This course focuses on special populations, nutrition, dermatology, the treatment of ophthalmologic diseases, and bone disorders/osteoporosis. **(48-0-3)**

PHRC 6865—Essentials of Professional Practice V

This is the conclusion of a five-course sequence that prepares the student to develop the knowledge and problem-solving skills needed to become a practice-ready professional who can apply concepts to manage the quality and safety of the medication-use process and deliver patient-centered care. This course addresses pharmacy law and advanced communication concepts and how they relate to professional practice. **(48-0-3)**

PHRC 6875—Evidence-Based Practice V

This is the fifth of a five-course sequence that prepares the student to retrieve, evaluate, and use the medical and scientific literature and other drug information resources. The course focuses on theories and methodologies of pharmacoconomics and outcomes research. Applications to clinical practice, the pharmaceutical industry, and formulary decision-making are explored. **(32-0-2)**

PHRC 6885—Leadership and Professional Development V

This is the fifth in a series of five courses that focus on personal and professional development. This course emphasizes the maturation of the student into the ideal professional candidate. Students reflect on experiences and career goals toward their chosen professional path. They develop tools for employment by creating a cover letter and curriculum vitae, updating their LinkedIn profile, and practicing job interviewing skills. Students will learn through a combination of self-reflection and constructive criticism provided by classmates. Curriculum and cocurricular activities stimulating student growth are tracked through the electronic portfolio. **(16-0-1)**

PHRC 6895—Integrated Pharmacy Applications V

This is the fifth in a series of five courses offered at the end of each semester designed to integrate and apply knowledge and skills from previous courses. Students in each course become certified in a specific area of pharmacy and receive software

training. The Bring Back and Look Forward sections of the course reinforce concepts and introduce material to prepare students for future courses. This course utilizes patient cases to apply pharmacotherapy concepts. It offers certification in medication therapy management and outlines expectations for P3 and Advanced Standing P2 winter semester. **(32-0-2)**

PHRC 6920—Seminar

This course applies the knowledge and skills gained through the Essentials of Professional Practice and Evidence-Based Practice course sequences. Student teams develop a platform presentation and professional poster to showcase innovative solutions to a pharmacy practice problem identified and researched in previous courses. Presentations are made to peers and health care professionals, providing valuable experience in presentation skills and in medical information resource utilization. **(16-0-1)**

PHRC 7700—Integrated Care

This is the final course in the core didactic curriculum. It is designed to advance students' critical-thinking skills and application of pharmaceutical knowledge to patient care in a variety of health care settings. The course enhances students' patient-care competencies and ensures students' readiness to commence Advanced Pharmacy Practice Experiences (APPEs). This is achieved using a variety of learning activities and assessment methods that include complex patient cases, pharmacy calculations, drug information questions, application of communication skills, knowledge of commonly used drugs, and pharmacotherapy during interprofessional experiences. The course contains several assessments that must be successfully completed prior to commencing APPEs. **(64-0-4)**

PHRC 7710—APPE: Internal Medicine

The Internal Medicine Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week), core rotation supervised by licensed pharmacist(s) in an inpatient, institutional, clinical practice setting. This experience is designed to optimize students' competency in patient care, patient education, medication safety, interprofessional collaboration, and evidence-based medication management. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse adult patient populations and members of the health care team. They use disease-state knowledge, drug therapy guidelines, and site-specific procedures to identify and prevent drug therapy problems and apply the Pharmacists' Patient Care Process (PPCP) to ensure safe medication use and optimal patient outcomes. Verbal and written communication skills are practiced through interaction with patients, their caregivers, and members of the health care team and by documenting interventions appropriate for a medical record. **Prerequisite:** successful completion of all first- to third-year coursework **(0-240-6)**

PHRC 7720—APPE: Ambulatory Care

The Ambulatory Care Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week), core rotation supervised by licensed pharmacist(s) in an outpatient pharmacy setting that emphasizes individualized direct patient care for ambulatory patients. Students apply and advance their knowledge, skills, abilities, professional judgment, and behaviors developed in the pre-APPE curriculum and cocurriculum. This experience is designed to optimize students' competency in patient care, patient education, medication safety, interprofessional collaboration, and evidence-based medication management. Students apply drug and disease-state guidelines to identify and prevent therapeutic problems and create, implement, and monitor patient-care plans. They use verbal and written communication skills to interact and build relationships with patients, their caregivers, and members of the health care team and to document interventions appropriate for a medical record. Motivational interviewing, patient education, medication management, and counseling skills are practiced. Students apply the Pharmacists' Patient Care Process (PPCP) to ensure safe medication delivery and optimal patient outcomes.

Prerequisite: successful completion of all first- to third-year coursework **(0-240-6)**

PHRC 7730—APPE: Advanced Hospital

The Advanced Hospital Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week), core rotation supervised by licensed pharmacist(s) in an institutional pharmacy setting. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum. This experience is designed to optimize students' competency in managing pharmacy operations, clinical services, and health care delivery while emphasizing the interprofessional dynamics of the institutional setting. Students dispense (compound) sterile and non-sterile products, manage pharmacy operations, and evaluate clinical services and medication safety programs. They become familiar with pharmacy metrics, drug shortages, formulary management, and the application of management principles for oversight of pharmacy personnel and clinical services. All components of the medication-use process are emphasized to ensure safe medication delivery and optimal patient outcomes. **Prerequisite:** successful completion of all first- to third-year coursework **(0-240-6)**

PHRC 7740—APPE: Community Pharmacy

The Community Pharmacy Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week), core rotation supervised by licensed pharmacist(s) in a community pharmacy setting. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and

cocurriculum. This experience is designed to optimize students' competency in patient care, outpatient health care delivery, and community pharmacy operations. They dispense and bill for medications, provide education and counseling for prescription and nonprescription drugs, triage patients to appropriate care, provide medication therapy management, and administer vaccinations. Effective communication with patients, their caregivers, and members of the health care team is emphasized. Students evaluate pharmacy metrics, continuous quality improvement processes, and inventory management. They apply the medication-use process and Pharmacists' Patient Care Process (PPCP) to ensure safe medication delivery and optimal patient outcomes. **Prerequisite:** successful completion of all first- to third-year coursework **(0-240-6)**

PHRC 7750—APPE: Elective I

The Direct Patient Care—Patient-Centered Care Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised by licensed pharmacist(s) in an inpatient or outpatient clinical practice setting. This experience is designed to optimize students' competency in patient care, patient education, medication safety, interprofessional collaboration, and evidence-based medication management. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse patient populations and members of the health care team. They use disease-state knowledge, drug-therapy guidelines, and site-specific procedures to identify and prevent drug therapy problems and apply the Pharmacists' Patient Care Process (PPCP) to ensure safe medication use and optimal patient outcomes. Verbal and written communication skills are practiced through interaction with patients, their caregivers, and members of the health care team and by documenting interventions appropriate for a medical record. **Prerequisite:** successful completion of all first- to third-year coursework **(0-240-6)**

PHRC 7760—APPE: Elective II

In this course students may select to participate in one of the following experiences:

1. The Direct Patient Care—Patient-Centered Care Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised by licensed pharmacist(s) in an inpatient or outpatient clinical practice setting. This experience is designed to optimize students' competency in patient care, patient education, medication safety, interprofessional collaboration, and evidence-based medication management. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse patient populations and members of the health care team. They use disease-state knowledge, drug-therapy guidelines, and site-specific

procedures to identify and prevent drug-therapy problems and apply the Pharmacists' Patient Care Process (PPCP) to ensure safe medication use and optimal patient outcomes. Verbal and written communication skills are practiced through interaction with patients, their caregivers, and members of the health care team and by documenting interventions appropriate for a medical record.

2. The Direct Patient Care—Medication-Use System Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised by licensed pharmacist(s) in a pharmacy practice setting. This experience is designed to optimize students' competency in patient care and health care delivery in various pharmacy settings. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse patient populations and members of the health care team. They apply the Pharmacists' Patient Care Process (PPCP) and use disease-state and medication-related knowledge and site-specific procedures to ensure safe medication use and optimal patient outcomes. Verbal and written communication skills are practiced through interaction with patients, their caregivers, and members of the health care team and by documenting professional activities. **Prerequisite:** successful completion of all first- to third-year coursework **(0-240-6)**

PHRC 7770—APPE: Elective III

In this course, students may select to participate in one of the following experiences:

1. The Direct Patient Care—Patient-Centered Care Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised by licensed pharmacist(s) in an inpatient or outpatient clinical practice setting. This experience is designed to optimize students' competency in patient care, patient education, medication safety, interprofessional collaboration, and evidence-based medication management. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse patient populations and members of the health care team. They use disease-state knowledge, drug-therapy guidelines, and site-specific procedures to identify and prevent drug therapy problems and apply the Pharmacists' Patient Care Process (PPCP) to ensure safe medication use and optimal patient outcomes. Verbal and written communication skills are practiced through interaction with patients, their caregivers, and members of the health care team and by documenting interventions in the medical record.

2. The Direct Patient Care—Medication-Use System Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised by licensed pharmacist(s) in a pharmacy practice setting. This experience is designed to optimize students' competency in

patient care and health care delivery in various pharmacy settings. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse patient populations and members of the health care team. They apply the Pharmacists' Patient Care Process (PPCP) and use disease-state and medication-related knowledge and site-specific procedures to ensure safe medication use and optimal patient outcomes. Verbal and written communication skills are practiced through interaction with patients, their caregivers, and members of the health care team and by documenting professional activities.

3. The Nonpatient Care Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised by licensed pharmacist(s) or other preceptor(s) in varied settings. This experience is designed to optimize students' professional maturity and explore various sectors of practice to support achievement of educational outcomes. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse individuals in pharmacy-related fields. Verbal and written communication skills are emphasized through interaction with preceptors, staff members, colleagues, and internal and external stakeholders. **Prerequisite:** successful completion of all first- to third-year coursework **(0-240-6)**

PHRC 7780—APPE: Elective IV (optional)

In this course, students may select to participate in one of the following experiences:

1. The Direct Patient Care—Patient-Centered Care Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised by licensed pharmacist(s) in an inpatient or outpatient clinical practice setting. This experience is designed to optimize students' competency in patient care, patient education, medication safety, interprofessional collaboration, and evidence-based medication management. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse patient populations and members of the health care team. They use disease-state knowledge, drug-therapy guidelines, and site-specific procedures to identify and prevent drug therapy problems and apply the Pharmacists' Patient Care Process (PPCP) to ensure safe medication use and optimal patient outcomes. Verbal and written communication skills are practiced through interaction with patients, their caregivers, and members of the health care team and by documenting interventions appropriate for a medical record.

2. The Direct Patient Care—Medication-Use System Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised

by licensed pharmacist(s) in a pharmacy practice setting. This experience is designed to optimize students' competency in patient care and health care delivery in various pharmacy settings. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse patient populations and members of the health care team. They apply the Pharmacists' Patient Care Process (PPCP) and use disease-state and medication-related knowledge and site-specific procedures to ensure safe medication use and optimal patient outcomes. Verbal and written communication skills are practiced through interaction with patients, their caregivers, and members of the health care team and by documenting professional activities.

3. The Nonpatient Care Advanced Pharmacy Practice Experience (APPE) is a six-week, full-time (minimum of 40 hours per week) elective rotation supervised by licensed pharmacist(s) or other preceptor(s) in varied settings. This experience is designed to optimize students' professional maturity and explore various sectors of practice to support achievement of educational outcomes. Students apply and advance their knowledge, skills, abilities, and behaviors developed in the pre-APPE curriculum and cocurriculum through interactions with diverse individuals in pharmacy-related fields. Verbal and written communication skills are emphasized through interaction with preceptors, staff members, colleagues, and internal and external stakeholders.

Prerequisite: successful completion of all first- to third-year coursework **(0-240-6)**

PHRC 7801—Curricular Review I

This is the first in the series of three courses that prepares students for the North American Pharmacists Licensure Exam (NAPLEX) and Multistate Jurisprudence Examination (MPJE). In this course, students will work through board examination materials; develop an effective study plan by reflecting on personal knowledge, skills, and abilities; and participate in a longitudinal, interprofessional activity. Students will receive guidance on handling common APPE assignments and career planning tips, including applying to pharmacy residencies.

Prerequisite: successful completion of all first- to third-year coursework **(16-0-1)**

PHRC 7802—Curricular Review II

The primary goal for the professional development capstone course series is to assess and strengthen students' knowledge and skills developed during the Pharm.D. curriculum. In Curricular Review II, students review and assess their knowledge and skills in preparation for the NAPLEX.

Prerequisite: successful completion of all first- to third-year coursework **(16-0-1)**

PHRC 7803—Curricular Review III

This is the third in a series of three curricular review courses that assess and strengthen students' knowledge and skills developed during the Pharm.D. curriculum. In Curricular Review III, students prepare for the NAPLEX and MPJE by completing quizzes and exams; viewing videos; and participating in live, interactive review sessions at the end of the course.

Prerequisite: successful completion of all first- to third-year coursework **(32-0-2)**

PHRE (Elective) Courses

PHRE 5001—Curricular Practical Training (CPT)

Pharmacy is a knowledge- and skill-based profession that optimizes professional interactions with health care team members and the patient. Students may desire to gain additional experience over what is offered through the IPPEs and APPEs prior to graduation. This course offers students additional opportunities to observe and emulate the roles and responsibilities of pharmacists in a pharmacy setting, as well as learn to effectively communicate with patients, pharmacists, and health care providers, and gain knowledge of the role of the pharmacist. Students will participate in a pharmacy environment to expand their knowledge of regulations; medication preparation; distribution; and interactions with insurers, prescribers, and patients. **(0-48-1)**

PHRE 5011—Functional Biochemistry and Physiology in Clinical Nutrition

This course delves deep into biochemical reactions that affect human physiology and create symptoms and diseases. The course assesses environmental, genetic, and epigenetic problems that may disrupt human biochemistry and physiology. It reviews biochemical pathways of neurotransmitters, hormones, fatty acids, amino acids, and carbohydrates in the mitochondria, nervous system, heart, kidneys, endocrine system, and other cell-signaling molecules to examine where the dysfunction may be corrected through diet, herbal medicine concepts, supplements, and other treatment modalities. **(48-0-3)**

PHRE 5021—Integrative Pharmacy and Clinical Nutrition I

This course provides foundations of how environmental factors, diet, medications, epigenetic changes, and genetic variables can disrupt biochemical pathways and create human physiologic imbalances and nutritional deficiencies that lead to various symptoms, illnesses, and diseases. The GI, endocrine, immune, nervous, circulatory, cardiovascular, genital-urinary, skeletal, and skin systems are analyzed as they pertain to biochemistry, nutrient utilization, physiological function, symptom, dysfunction, and disease. Medical problems are evaluated from a clinical nutrition perspective, evaluating nutrient depletions and nutritional deficiencies. Vitamins,

minerals, nutritional components of food, herbal remedies, and supplements are assessed and considered as part of treatment plans for patients. **(48-0-3)**

PHRE 5041—Essentials of Project Management for Pharmacy I

This course serves as an introduction to project management terminology, knowledge, concepts, and skills used in the current work environment. The course lays the foundation of project management methods and best practices. Topics covered guide the student on the use of project management tools and techniques to initiate, plan, execute, monitor, and close a project. Students learn about planning, scheduling, organizing, and implementing projects and explore current practices in project management from a pharmacy perspective. **(32-0-2)**

PHRE 5051—Essentials of Project Management for Pharmacy II

This course will prepare students for the project management work environment through a deeper understanding of leadership and team dynamics. In addition, the course introduces negotiation techniques, ethical principles and practices, and professional standards in the workplace. Topics covered guide the student on Lean Six Sigma (LSS) tools and techniques to achieve operational excellence and improve business process efficiency in the work environment. Students will have the opportunity to learn Lean Six Sigma fundamentals, tools, and concepts toward achieving a Yellow Belt certificate administered by LinkedIn Learning. The material introduced in the course is presented from a pharmacy perspective. **(32-0-2)**

PHRE 5107—Current Topics in Pharmaceutical Sciences

This course covers special topics selected by faculty members and visiting scientists. The goal of each topic is to provide the student with an understanding of, and an appreciation for, current problems and procedures underlying the pharmaceutical sciences discipline. **Prerequisite:** Topic dependent; please see course coordinator for details. **(16-32]-0-[1-2])**

PHRE 5113—Current Topics in Pharmaceutical Sciences

This course covers special topics selected by faculty members and visiting scientists. The goal of each topic is to provide the student with an understanding of, and an appreciation for, current problems and procedures underlying the pharmaceutical sciences discipline. **Prerequisite:** Topic dependent; please see course coordinator for details. **(16-32]-0-[1-2])**

PHRE 5151—Introduction to Herbal Medicine

Pharmacy has a rich history in the study and use of herbal medicines. This course will briefly explore the history of botanical medicine, the properties of the herbs, their various applications in the treatment of disease, and how to ensure the safe use of herbal products. **(32-0-2)**

PHRE 5205—Introductory Spanish for Pharmacists

This course provides non-Spanish speakers with the first steps in speaking Spanish to better communicate with patients and caregivers whose primary language is Spanish. The course provides an introduction to the basic Spanish terms and phrases frequently used during patient-pharmacist interactions, and culturally appropriate strategies for communicating with Hispanic patients and families. **(32-0-2)**

PHRE 5221—Introduction to Molecular Medicine

This course introduces content important to understanding the genetic basis of diseases, their identification, and their treatment. Additionally, the developing areas of cancer immune therapies and gene surgeries are covered. For students who may not possess a thorough knowledge of molecular biology and developing technologies, the course involves class presentations and other activities for developing a better understanding of the genetic basis of disease. **(32-0-2)**

PHRE 5223—Drugs of Abuse

This course covers types of substances abused, methods and routes of administration, the pertinent toxicokinetics, the pharmacological/toxicological mechanisms, and the clinical manifestations of drug abuse. The anatomical and neurochemical substrates of drugs of abuse are also described. Treatment of intoxication and withdrawal, societal impact of drug abuse, legal implications, and current trends of substance abuse are addressed as well. **Prerequisite:** P3 Standing. **(32-0-2)**

PHRE 5243—Fundamentals of Pharmacognosy

This course provides an overview of medicinal drugs derived from plants and other natural sources. The major classes of medicinally active natural products, their origin (nomenclature + taxonomy), structure, biosynthesis, and mode of action will be covered. The naturally derived constituents and their therapeutic efficacy will be discussed. **(32-0-2)**

PHRE 5301—Measuring, Improving, and Reporting Quality of Care in Pharmacy Practice

This course explores optimizing patient outcomes by improving the quality of the Medication-Use Process. It focuses on the knowledge, skills, and methods which, if applied effectively, can assure a high-quality and safe patient and family health care experience in a variety of practice settings. The purpose of this course is to develop, integrate, and apply knowledge

about quality improvement, performance measurement, and the transformation of the U.S. health care system to a value-based system. Students will gain familiarity with the concepts of quality improvement, patient safety, and medication error prevention and how these concepts can be used in collaboration with patients, physicians, other health care professionals, administrators, and regulators. **(32-0-2)**

PHRE 5305—Pharmacy Practice in Managed Care

Students learn and apply managed care pharmacy practice theory to provide medication therapy management, patient education, and counseling and to offer provider recommendations to optimize patient outcomes. Professional and leadership skills are reinforced as students work in an interdisciplinary team developing problem-solving skills, effective communication strategies, and team collaboration. Students use telephonic and remote patient monitoring systems and electronic health record databases to perform drug utilization reviews, medication reconciliation, and transitions of care. **(16-48-2)**

PHRE 5311—Pharmaceutical Marketing

This course provides students with a working knowledge of analysis, planning, and control of marketing efforts crucial to roles as managers and leaders in the pharmacy profession. Students learn about marketing management, customer behavior, design and management of service processes, and customer loyalty and satisfaction. Students will think in concrete terms and apply marketing knowledge as they develop marketing strategies for a pharmacy product or service. **(32-0-2)**

PHRE 5345—Pharmacists, Pharmaceuticals, and the Media

This course will explore how various forms of media have portrayed pharmacists over the years. It will also investigate how pharmaceuticals and other drugs are reported by the press and are presented by the entertainment industry. Students will discuss the content of articles. The phenomena and occurrence of drug effects (drug-taking experiences) are examined, integrating information from both pharmaceutical and social sciences, to study how and why drugs are used. Historical and cross-cultural examples are employed in this dialogue on the nature and meaning of drug-taking experiences and their influence on drug-taking behaviors. **Prerequisite:** P3 Standing **(32-0-2)**

PHRE 5353—Contemporary Topics in Pharmacy

This course provides a broad spectrum of contemporary issues related to pharmacy practice, the pharmaceutical industry, third-party payment, and health policy. It aims to increase student awareness and understanding of the changes in pharmacy practice and their impact on the U.S. health care system. **(32-0-2)**

PHRE 5389—Pharmacy Law of Puerto Rico

This course covers the laws, regulations, and administrative orders that regulate the practice of the pharmacy profession; the occupation of a pharmacy technician; and the manufacture, distribution, and dispensing or dispatch of medications in Puerto Rico. Special emphasis will be given to the dispensing of controlled substances in accordance with applicable local and federal legislation. In addition, general aspects of professional law and ethics will be covered. **(32-0-2)**

PHRE 5401—Current Topics in Sociobehavioral and Administrative Pharmacy

Specialized topics dealing with current issues, procedures, and policies related to sociobehavioral pharmacy are covered in this course. **(16-48]-0-[1-3])**

PHRE 5411—Current Topics in Pharmacy Practice

This course discusses topics on current issues, procedures, and policies related to pharmacy practice. Topics can vary from semester to semester. **(32-0-2)**

PHRE 5417—Veterinary Pharmacotherapy

This course is structured to provide pharmacy students with the necessary knowledge to be able to confidently prepare and dispense animal prescriptions and offer counseling to pet owners regarding these medications. Common diseases that affect canines and felines (small animals) will be discussed, as well as current pharmacotherapeutic approaches. Similarities and differences between humans and animals related to specific disease states will be discussed. Pharmacotherapeutic approaches to be discussed include human-labeled medications that are used extra-label in animals, medications that have both human-labeled and veterinary-labeled formulations, and medications exclusively approved to treat medical conditions in animals. OTC product use in animals will also be presented to better prepare pharmacy students for those unexpected questions asked by pet owners. Other topics include specific regulations regarding medications in animals, compounding, preventatives, pet insurance, and alternative medicine approaches. **(32-0-2)**

PHRE 5421—Modern Medicine

This course aims to integrate various multidisciplinary domains of science and technology to address the development and translation of advanced multifunctional pharmaceuticals for targeted therapy of specific organs/tissues/cells in hard-to-treat diseases. The course describes different types of smart, multifunctional drug delivery systems (DDSs) and drug delivery devices (DDD) using various advanced nanobiomaterials. The course elaborates on the applications of nanoscale multimodal DDSs/DDDs in targeted therapy of detrimental diseases, such as solid tumors. It outlines cell-/tissue-specific targeted therapy and provides overviews on the applications of theranostics for simultaneous diagnosis and therapy. **(32-0-2)**

PHRE 5431—Oncologic Treatments and Pharmacogenomics

This course introduces the basic molecular concepts of cancer and pharmacogenomics in the context of cancer treatment. It presents the current methodologies used in cutting-edge oncology for the treatment of two of the most common types of cancer: breast and colon. The standard-of-care combinatorial regimens will be presented, as well as the treatment scenarios that are applied to advanced-stage and recurrent disease. Drugs that have increased patient tolerance to these genotoxic regimens will also be discussed. Finally, the application of next-generation sequencing of tumor DNA or RNA to determine which of the more than 300 druggable mutations exist in these tumors will be discussed, primarily in the cancer-recurrence setting. Prognostic tests based on RNA expression from tumors will be covered. Discussion of the rationale for insurance coverage of pharmacogenomics will be covered as well. The impact of oncologic pharmacogenomics on future clinical trials will also be examined. **(32-0-2)**

PHRE 5447—Regulatory Affairs

This course provides exposure to the important and critical area of drug regulatory matters. It describes the role of federal laws, regulations, and the structure and operation of the U.S. Food and Drug Administration. It also compares similar agencies in other countries. **(32-0-2)**

PHRE 5505—Consulting Pharmacy in Long-Term Care

This course focuses on the practice of consulting pharmacy practice in long-term care facilities. It provides an overview of geriatric consulting statutes that regulate the activity of the consultant pharmacist, the Health Care Financing Administration survey guidelines, and the types of facilities required to have a consultant pharmacist. Students will apply the Pharmacists' Patient Care Process in addressing geriatric patient medication-related needs in this setting. **Prerequisite:** P3 Standing/PHRC 5935 **(32-0-2)**

PHRE 5513—Special Population Needs and the Role of the Pharmacist

This course uses the framework of social determinants of health and the ecological model and provides a holistic perspective to vulnerable and special populations. Students have an opportunity to explore the needs of special populations from a pharmacist's perspective, enabling students to self-assess their preconceived knowledge and gain a new perspective to practice pharmacy. Students acquire knowledge about factors that influence and intersect with vulnerable populations. Students are expected to design an intervention for a population of their interests, applying the knowledge and skills they have acquired. This is an online course that requires students to work independently and with other class members to complete a project. **(32-0-2)**

PHRE 5515—Health Disparities and Chronic Diseases: The Role of the Pharmacist

This course presents the main causes and pathways to health disparities in the United States. It focuses on chronic diseases, such as diabetes, cancer, and cardiovascular diseases. Emphasis is given to disparities associated with access to medication, access to pharmacy services, and to adherence. Students learn about pharmacy-led interventions aimed at reducing health disparities. They are expected to use epidemiological data to study the disparities and to formulate recommendations to the pharmacy field. Students are assessed through hands-on, structured assignments. **(32-0-2)**

PHRE 5517—Biologics and Beyond

This course introduces and familiarizes students with biologic drugs, FDA-approved biosimilars, antibody-drug conjugates, gene medicine products, and cell therapy products. Mechanisms of actions, disposition principles, dosing and product handling aspects, therapeutic use, drawbacks, and ongoing trials/research are discussed. Students will work in teams to study the characteristics of biologics by disease categories and drug types. **(32-0-2)**

PHRE 5551—Nutrition and Wellness in Pharmacy Practice

This course provides strategies to improve nutritional status, health, and wellness. It highlights nutritional wellness, foods, and diets that may be used to help maintain or improve health. It reviews epidemiological and genetic aspects of individuals, nutritional deficiencies, and environmental causes of illness and disease. Additionally, it presents the tools needed to conduct nutritional and environmental assessments, comprehend patients' anthropometrics, and provide nutritional guidance and wellness plans for patients. **(32-0-2)**

PHRE 5619—Pharm.D./D.M.D. Interprofessional Experience

This interprofessional education (IPE) course provides an opportunity to engage in multidisciplinary health care. Pharmacy and dental students will work together at a dental clinic exclusively serving patients with HIV. In collaboration with dental students, pharmacy students will obtain accurate medication histories from patients, update medical records appropriately, and provide patient education on antiretroviral therapy and dental hygiene. Didactic lectures will address overall health management of individuals with HIV. Students are expected to be at the dental clinic approximately five hours per week for seven weeks. **Prerequisite:** PHRC 5935 **(16-48-2)**

PHRE 5637—History of Pharmacy

This course provides an overview of the history of pharmacy as a profession and provides experience in interpreting and analyzing historical pharmacy data and information from historical sources and references. It primarily focuses on American pharmacy from the colonial times to present day. Topics include the evolution of practice, changes in education

and licensure requirements, the development of professional organizations, the growth of the pharmaceutical industry, and the role of pharmacy in contemporary health care practice. In addition, the course includes an introduction to pharmacy artifacts and the integral role they played in the development of pharmacy in the United States. The course helps students apply wisdom about pharmacy's past to guide evolving changes in the pharmacy profession. **(32-0-2)**

PHRE 5641—Applied Secondary Database Analysis

This course gives students the opportunity to apply skills learned in the research design and biostatistics courses by completing a secondary data analysis research project using a federal database. By the end of the course, students will have written a basic research protocol, become familiarized with the basic structure and methodology of the United States National Health and Nutrition Examination Survey (NHANES) database, prepared a dataset, conducted descriptive and basic statistical analyses using SPSS, written an abstract, and delivered a presentation to a professional audience. **(32-0-2)**

PHRE 5643—Parenteral Medication Therapies

This course exposes students to topics and skills that expand their knowledge of the use of intravenous therapies in the management of diseases. The student will learn both didactically and in small-group, hands-on activities. After completion of this course, the student should be more prepared to compound, evaluate, and monitor IV therapies. **(16-48-2)**

PHRE 5991—Research in Pharmacy Practice

Students, under the direction of one or more pharmacy practice faculty members, will perform individual research projects. Projects may involve direct patient care or translational research (e.g., pharmacokinetics, pharmacogenomics). Semester credits must be negotiated with the adviser and approved by the department chair prior to the start of any work. Students will be involved in both the planning and execution of the research project. **(0-[48-144]-[1-3])**

PHRE 5993—Literature Research in Pharmaceutical Sciences

The course involves the directed reading, evaluation, and analysis of scientific literature (papers and reviews) in the fields of pharmacology, pharmaceuticals, biopharmaceuticals, pharmacokinetics, drug delivery systems, pharmaceutical technology, biotechnology, and toxicology, among others. It involves thorough reading and assimilation of scientific information and preparing reports and/or manuscripts as agreed between the adviser and advisee. Through a mutual agreement between the faculty member and the student, a

specific area of research within a field will be selected. Under the direct supervision of a faculty member, students will be

- trained on the retrieval of scientific information
- mentored to understand the findings of the paper(s)
- taught to build hypotheses of their own on the leading topics from various publications and reviews
- trained in writing papers and reviews

(0-[48-96]-[1-2])

PHRE 5995—Research in Sociobehavioral and Administrative Pharmacy I

This research elective course is designed to provide students with fundamental understanding of issues surrounding research methodology in pharmacy, public health, and biomedical science researches. The course provides guidance to students through the complete research process, from formulation of research problem and hypothesis, to literature review, data collection and analysis, and summary of research report. **(0-[48-144]-[1-3])**

PHRE 5997—Research in Sociobehavioral and Administrative Pharmacy II

This research elective course is the continuation of the Research in Sociobehavioral and Administrative Pharmacy I elective course. It is designed to provide guidance to students through the complete research processes, from formulation of a topic to data collection and analysis, to completion of a final report. The amount and nature of the work to be done for this research elective course will be determined by the individual faculty research adviser. **Prerequisite:** PHRE 5995 **(0-[48-192]-[1-4])**

PHRE 5999—Research in the Pharmaceutical Sciences

In this course, students work under the direction/supervision of one or more faculty members in a research laboratory. Students are involved in planning and executing an approved research project using basic techniques of scientific research. Students will be awarded 3 or 4 semester credits on the basis of 48 laboratory hours per credit. **(0-[144-192]-[3-4])**

PHRE 6997—Travel Study Program

The program provides students with an overview, understanding, and appreciation for pharmaceutical and medical practices outside the United States. Visits to pharmacies, hospitals, and cultural sites in the region allow students to study and experience the history, culture, and health care practices of the country visited. **(48-0-3)**

Master of Science (M.S.) in Pharmaceutical Affairs

The Master of Science (M.S.) in Pharmaceutical Affairs is a one-year program designed for people interested in the acquisition of knowledge and skills in the health care and biomedical field. The degree prepares students for managerial positions in the pharmaceutical industry, health care systems, academia, managed care organizations, contract research organizations, and governmental and nongovernmental agencies. The M.S. in Pharmaceutical Affairs provides additional preparation prior to pursuing professional careers within the health care system, such as pharmacy, medicine, physician assistants, and nursing, among others. Graduates will be able to critically analyze issues related to the health care environment and act as leaders in the field.

Admissions Requirements

The M.S. in Pharmaceutical Affairs program bases its selection of candidates on academic performance, personal interviews, written applications, and letters of reference.

1. Prior to matriculation, applicants must have received a baccalaureate degree from a regionally accredited college or university. A baccalaureate degree in science fields—such as biology, biochemistry, chemistry, bioengineering, health care, or a related major—are acceptable.
2. Applicants must have a minimum cumulative GPA of 2.0 (recommended 2.5) on a 4.0 scale.
3. Pharmacy College Admission Test (PCAT) or Graduate Record Exam (GRE) scores are optional.

For those applicants who choose to submit official scores from the PCAT or GRE

- PCAT scores must be no more than **three** years old at the time of application. Applicants should take the PCAT no later than February prior to the expected date of matriculation. Candidates may register online at pcatweb.info, or call 800-622-3231 with any questions.
 - GRE scores must be no more than **three** years old at the time of application. Applicants should take the GRE no later than April prior to the expected date of matriculation. You may register online at gre.org, or call (609) 921-9000 if you have any questions.
4. Two letters of reference from a preprofessional committee—or, if such a committee does not exist, one letter of reference from a science professor and one letter of reference from a liberal arts professor—are necessary.

Foreign Graduates

Foreign graduates may be eligible for admission with

1. a Bachelor of Science degree or a bachelor's degree in a related health care field from an accredited institution. See details below under foreign coursework.
2. completion of bachelor's degree coursework with a minimum cumulative GPA of 2.0 on a 4.0 scale (recommended 2.5)

Application Procedures

The Office of Admissions processes applications on a rolling basis; therefore, it is in the best interest of the applicant to apply early. The PharmGrad application process may take up to six weeks to complete.

1. Apply to PharmGrad electronically through Pharmgrad.org.

- application deadline: **July 1**

2. Send supporting documents to PharmGrad.

- official transcripts from all colleges and universities attended (submitted directly to PharmGrad by the college or university and/or foreign credential evaluation service)
- two letters of reference
- official PCAT and/or GRE scores (optional)
- proof of English proficiency (required for non-native English speakers)

The following standardized tests currently satisfy NSU Barry and Judy Silverman College of Pharmacy English requirements for non-native English speakers:

- Test of English as a Foreign Language (TOEFL): minimum score of 80 on the Internet-based test or 213 on the computer-based test (toefl.org)
- International English Language Testing System (IELTS): minimum score of 6.0 on the test module (ielts.org)
- Duolingo Test of English: minimum score of 105 (duolingo.com)

** Scores may be no more than **two** years old at the time of the interview.*

Candidates who have taken college courses in the United States may also prove English proficiency by completing, with a minimum cumulative GPA of 2.0 on a 4.0 scale, two college-level English composition courses at a regionally accredited college or university in the United States.

All admissions materials and foreign evaluations must be mailed to

- Nova Southeastern University
Enrollment Processing Services (EPS)
College of Pharmacy Admissions
3300 S. University Drive, PO Box 299000
Fort Lauderdale, FL 33328-2004

Interview Process

A personal interview is part of the admissions process; however, being interviewed is not a guarantee of admission. Upon receipt of the completed application, a review will be made to determine if the applicant will be granted an interview. Not all applicants will be granted an interview. The Office of Admissions will notify selected applicants for interviews. Interviews may be conducted using online platforms in the event the applicant cannot attend an in-person interview.

Notice of Acceptance

Notice of acceptance or other action by the committee on admissions will be on a “rolling” or periodic schedule. Early completion of the application process is in the best interest of the applicant. Admission to the program is contingent upon meeting all the requirements prior to the first day of the semester.

Transcripts

Upon acceptance, final and official transcripts from all colleges and universities attended, and/or final and official documents, must be received within 90 calendar days from the start of the semester. If not received by that time, the student will not be allowed to continue class attendance. Financial aid will not be disbursed to a student until all the required documents are received and the student is fully admitted.

Foreign Coursework

Applicants who have completed coursework outside of the U.S. must request an official foreign evaluation report from World Education Services, Inc. (WES) or Educational Credential Evaluators (ECE). Please request a course-by-course foreign transcript evaluation report (FTER), with an overall GPA calculation, sent directly from WES or ECE to PharmGrad.

- World Education Services, Inc.
(212) 966-6311 • 800-361-3106 • wes.org

- *By Postal Mail*
WES Reference #
WES Global Documentation Centre
PO Box 2008 STN MAIN
Newmarket, ON, L3Y 0G5
Canada

- *By Express Courier*
WES Reference #
WES Global Documentation Centre
14-145 Industrial Parkway South
Aurora, ON, L4G 3V5
Canada

- Educational Credential Evaluators, Inc.
101 West Pleasant Street, Suite 200
Milwaukee, WI 53212-3963
(414) 289-3400 • ece.org

It is the applicant’s responsibility to have this coursework evaluated. An official course-by-course evaluation with a cumulative grade point average must be sent directly from the evaluation service to PharmGrad.

All admissions materials and foreign evaluations sent to Nova Southeastern University must be mailed to

- Nova Southeastern University
Enrollment Processing Services (EPS)
College of Pharmacy Admissions
3300 S. University Drive, PO Box 299000
Fort Lauderdale, FL 33328-2004

Program Requirements

Students must have an iPad or personal computer for assignments and assessments and have an active account with an Internet service provider. In addition, students must have ongoing access to a computer capable of connecting to the Internet and playing streaming video files. Online course notes and discussions will be provided to the student through an online course management system. NSU will provide access to email, online databases, and library resources.

Tuition: M.S. in Pharmaceutical Affairs Program

All tuition and fees are subject to change by the board of trustees without notice.

Annual tuition will be posted online at pharmacy.nova.edu.

Fees, Expenses, and Deposit— All Programs

- Acceptance and Preregistration Deposit—\$1,000. This deposit is required to reserve the accepted applicant’s place in the entering, first-year class. This deposit will be deducted from the tuition payment due on registration day, but is not refundable in the event of a withdrawal. It is due within three weeks of an applicant’s acceptance.
- Pharmacy General Access Fee—\$145 per annum.
- NSU Student Services Fee—\$1,800 per annum.
- Late Payment Fee—\$100. All tuition and fees not paid within 30 days after the start of the semester will incur this fee.
- BJSCOP Fees and Expenses—Additional fees and expenses may be incurred for college-approved activities. These fees and expenses are estimated at \$500 over the course of the program.

The first semester's tuition and fees, less the nonrefundable, \$1,000 deposit, are due on or before the first day of classes. Tuition for each subsequent semester is due on or before the first day of classes. Students will not be permitted to register or attend classes until their financial obligations have been met. The financial ability of applicants to complete their training at the college is important. Applicants should have specific plans for financing their professional education. This should include tuition, fees, iPad or personal computer, computer-related expenses, health insurance, books, printing, required equipment, and living and other miscellaneous expenses.

Each student is required to carry adequate personal medical and hospital insurance. For more information about NSU's required health insurance, visit the website at nova.edu/bursar/health-insurance.

Course of Study

The one-year degree program will provide a strong science foundation for those interested in pursuing doctoral-level graduate programs in pharmacy and other health care or science fields. Students will be better prepared to further pursue the professional doctoral-level career paths currently being offered nationwide.

Some courses may be offered in a hybrid model, which includes synchronous and asynchronous online learning, as well as on-campus learning and videoconferencing. Some courses will be combined with existing Pharm.D. and graduate courses, while others will be stand-alone, master's degree-specific courses. M.S. students may be assessed differently when appropriate.

The program must be completed within two academic years from the date of matriculation.

Note: *Completion of this program does not ensure prerequisite requirements needed to apply for health care-related degrees such as pharmacy. Students applying for these degrees after completing their M.S. in Pharmaceutical Affairs must comply with admissions requirements to those programs.*

International/Student Visa Information

It is the applicant's responsibility to contact the Office of International Students and Scholars for information on immigration regulations and student visa requirements at

- Nova Southeastern University
Attention: Office of International Students and Scholars
3300 S. University Drive
Fort Lauderdale, FL 33328-2004

(954) 262-7240
800-541-6682, ext. 27240
Fax: (954) 262-3846
Email: intl@nsu.nova.edu
nova.edu/internationalaffairs

Graduation Requirements

To receive a degree, a student must fulfill the following requirements:

- be of good moral character
- successfully complete all curricular requirements and assessments with a minimum cumulative GPA of 2.0 on a 4.0 scale within two academic years
- satisfactorily meet all financial, library, and university obligations to the university (to receive credentials)
- submit an application for degree/diploma to the registrar's office by the posted deadline

Curriculum Outline

These courses are representative of the overall requirements of the program at the time of publication. Updates to the curriculum will be posted online at pharmacy.nova.edu.

Fall/Winter/Summer			Credits
PHRM	5001	Health Economics	3
PHRM	5021	Population Health and Public Policy	3
PHRM	5212	Bioethical Principles of Life Science Research	3
PHRM	5801	Strategies for Success in Graduate School	2
PHRM	5820	Biochemical Basis of Drug Therapy	3
PHRM	5830	Fundamentals of Pharmacodynamics	2
PHRM	5840	Drug Medication and Society: History and Current Issues	2
PHRM	5871	Evidence-Based Practice I	1
PHRM	5921	Individualized Drug Therapy	4
PHRM	5940	Regulatory Affairs	3
PHRM	5972	Evidence-Based Practice II	2
PHRM	5990	Integrative Capstone in Pharmaceutical Affairs	6
PHRE		Electives	4
Total Credits			38

Master of Science (M.S.) in Pharmaceutical Affairs Course Descriptions

PHRM (Master's Degree)

Note: Listed at the end of each entry are lecture hours, laboratory hours, and credit hours.

PHRM 5001—Health Economics

This course focuses on the application of economic analysis as it relates to provision of health care and emerging health care trends in the United States and throughout the world. The course also focuses on understanding how health care markets differ from other markets, specifically on the economics of the health care sector and its major players, e.g., the government, insurers, providers, and patients. Economic concepts and tools will be used to analyze the health care system, and to examine implications and issues in health policy. **(48-0-3)**

PHRM 5021—Population Health and Public Policy

This highly interactive course introduces students to: (1) the fundamental concepts and frameworks used for the study of population health and public policy; (2) the financing and managing of health systems at the local and international levels; and (3) the formulation and analysis of public health policies. The course will emphasize the intersection of public health and the determinant of drug use and pharmacy-related policies. Students will have the opportunity to analyze and critically evaluate existing health policies, public health actions, and reforms. Students are expected to contribute and participate in the discussion of current research, case studies, and policies. Student learning will be assessed through oral exams, written assignments, presentations, and an analytical paper. This course will provide skills for the conceptualization of research projects addressing current health issues related to pharmacy. **(48-0-3)**

PHRM 5212—Bioethical Principles of Life Science Research

This course provides a structured approach for identifying, analyzing, and resolving ethical issues in medicine and the life sciences. Students analyze and discuss traditional philosophical theories regarding the nature of moral good. They will apply these theories to critical issues and selected case studies involving experiments with human subjects, organ transplantation, in vitro fertilization, the use of animals in research, the collection and publication of research data, conflicts of interest, and other topics of current concern. Students will explore the personal values, professional standards, and institutional guidelines that define the roles and responsibilities of the health care practitioner and researcher. **(48-0-3)**

PHRM 5801—Strategies for Success in Graduate School

This course provides strategies, skills, and tools to help students be successful in graduate school. These include study skills, time management, communication, teamwork, and active learning. Course materials also include an introduction to the U.S. and global health care models and systems and basic medical terminology. In-class activities challenge students to connect theory to practice, enhancing skills using assessments, reflective exercises, group activities, and student presentations. **(32-0-2)**

PHRM 5820—Biochemical Basis of Drug Therapy

This course focuses on the structure and function of vitamins, carbohydrates, proteins, hormones, nucleic acids, and lipids, as well as bioenergetics and major catabolic pathways at the cellular level. It establishes the biochemical basis for cell structure and emphasizes an integrated approach to the understanding of cellular metabolism; provides a biochemical, genetic, and molecular basis for understanding disease and drug functioning; and examines the mechanisms for genetic information flow in prokaryotic and eukaryotic cells. **(48-0-3)**

PHRM 5830—Fundamentals of Pharmacodynamics

This course applies the concepts of organic chemistry to understand drug action at the molecular level. It introduces students to basic pharmacological principles that explain drug effects as they pertain to mechanisms of action and drug disposition into different organs and tissues. In addition, it describes drug actions at physiological receptors, focusing on compounds that act on the autonomic nervous system. **(32-0-2)**

PHRM 5840—Drug Medication and Society: History and Current Issues

This course surveys the development of society's drug utilization practices as medication throughout history, from ancient application of medicinal substances for healing purposes to modern medicinal compounds. Cultural, economic, political, and religious issues affecting drug medication practices are discussed. Current topics pertaining to the discovery, adaptation, production, distribution, and consequences of drug medication are explored. **(32-0-2)**

PHRM 5871—Evidence-Based Practice I

This is the first of a sequence that prepares students to retrieve, evaluate, and use medical and scientific literature and other drug information resources. It is designed to prepare students to apply drug information skills for the delivery of patient-centered care, using evidence-based principles to improve outcomes. Students learn the strengths and weaknesses of the various references and how to apply their use in practice. Active learning experiences include retrieving scientific literature, utilizing electronic resources, performing literature searches, and formulating responses to basic drug information requests. **(16-0-1)**

PHRM 5921—Individualized Drug Therapy

This course explores the individualization of drug therapy. It provides students with the foundation in pharmacokinetic concepts and application. The principles involved in drug absorption, distribution, metabolism, and elimination in the human body are discussed and mechanisms and rates of these processes are studied. The influence of physiologic and biochemical process on the fate of drugs in the body are explored and pharmacokinetic principles are applied in the therapeutic monitoring of drugs. This course also provides students with a foundation on pharmacogenomic concepts. **(64-0-4)**

PHRM 5940—Regulatory Affairs

This course provides an exposure to the important and critical area of drug regulatory matters. It explores the role of federal laws, regulations, and the structure and operation of the U.S. Food and Drug Administration. It also compares similar agencies in other countries. **(48-0-3)**

PHRM 5972—Evidence-Based Practice II

This is the second of a sequence that prepares students to retrieve, evaluate, and use medical and scientific literature and other drug information resources. This course is designed to expose students to the fundamentals of research design and methodology and applied biostatistical data analysis. It focuses on familiarizing students with general methodologic approaches used in experimental design, statistical analysis of data, investigator's responsibilities, ethical considerations in research, protection of human subjects, and Institutional Review Boards (IRBs). **(32-0-2)**

**PHRM 5990—Integrative Capstone
in Pharmaceutical Affairs**

This course provides students with the opportunity to integrate and apply concepts and skills acquired throughout the M.S. in Pharmaceutical Affairs program to solve a pharmacy-related health issue. Students will select a current health challenge for analytical purposes and determine actions for its solution. They are expected to collectively gather data and information to evaluate and discuss the problem from different perspectives, using ideas and frameworks covered in previous courses, such as population health, health economics, bioethics, marketing, and regulatory affairs. Students will present their project at the end of the semester. **(96-0-6)**

Note: For PHRE (Elective) Courses, refer to the Pharm.D. PHRE section.

Master of Science (M.S.) in Pharmaceutical Sciences

The M.S. in Pharmaceutical Sciences is a two-year graduate program with one of three unique areas of emphasis: 1) Molecular Medicine and Pharmacogenomics—centering on drug discovery principles, 2) Drug Development (Pharmaceutics)—focusing on drug delivery to the desired target, or 3) Social and Administrative Pharmacy—concerned with the interface between pharmacy and society (pharmacy outcomes).

The degree will prepare students for positions in academia or technological or managerial positions in the pharmaceutical industry, contract research organizations, managed care organizations, health care systems, and government agencies. Upon successful completion of the degree, students are prepared for further study in a doctoral program, medicine, or a health-related discipline.

Admissions Requirements

Candidates who have an earned degree in a field related to the sciences will be considered for the M.S. in Pharmaceutical Sciences program. The college takes a holistic approach in the evaluation of applications, looking beyond grades and test scores, but also focusing on work history, extracurricular activities, and life experiences.

Those students applying to the Drug Development (Pharmaceutics) or the Molecular Medicine and Pharmacogenomics sequences are required to have earned a **Bachelor of Science degree in pharmacy, chemistry, biology, or a related scientific area**. Students applying to the Social and Administrative Pharmacy sequence are required to have earned a **Bachelor of Science degree in pharmacy, economics, statistics, public health, health services research, or other related fields**.

1. Applicants must have earned a baccalaureate degree from a regionally accredited institution of higher education.
2. Applicants must have earned a minimum cumulative GPA of 3.0 on a 4.0 scale.
3. Applicants that have taken the Graduate Record Examination (GRE) may submit official scores from the GRE general test (verbal reasoning, quantitative reasoning, and analytical writing). The GRE is optional.

- Scores must be **less than five years old** at time of application.
- For more information, please visit gre.org.
NSU Code: 5522

4. Three letters of reference on official letterhead, with a signature, from professors or supervisors in the applicant's field of study must be submitted.

Application Procedures

The Office of Admissions processes applications on a rolling basis; therefore, it is in the best interest of the applicant to apply early. The PharmGrad application process may take up to six weeks to complete.

1. Apply to PharmGrad electronically through Pharmgrad.org.

- application deadline: **July 1**

2. Send supporting documents to PharmGrad.

- official transcripts from all colleges and universities attended (submitted directly to PharmGrad by the college or university and/or foreign credential evaluation service)
- three letters of reference
- official GRE scores (optional)
- proof of English proficiency (required for non-native English speakers)

The following standardized tests currently satisfy NSU Barry and Judy Silverman College of Pharmacy English requirements for non-native English speakers:

- Test of English as a Foreign Language (TOEFL): minimum score of 80 on the Internet-based test or 213 on the computer-based test (toefl.org)
- International English Language Testing System (IELTS): minimum score of 6.0 on the test module (ielts.org)
- Duolingo Test of English: minimum score of 105 (duolingo.com)

* Scores may be no more than two years old at the time of the interview.

Candidates may also demonstrate English proficiency by successfully completing a baccalaureate, master's, or professional degree in the United States or two college-level English composition courses at a regionally accredited college or university with a minimum cumulative GPA of 2.0 on a 4.0 scale.

All application materials and foreign evaluations must be mailed to

- Nova Southeastern University
Enrollment Processing Services (EPS)
College of Pharmacy Admissions
3300 S. University Drive, PO Box 299000
Fort Lauderdale, FL 33328-2004

Interview Process

A personal interview is part of the admissions process; however, being interviewed is not a guarantee of admission. Upon receipt of a completed application, a review will be made to determine

if the applicant will be granted an interview. Not all applicants will be granted an interview. The Office of Admissions will notify selected applicants for interviews.

Notice of Acceptance

Notice of acceptance or other action by the Committee on Admissions will be on a “rolling” or periodic schedule. Early completion of the application process is in the best interest of the applicant. Admission to the program is contingent upon successful completion of all prerequisite coursework prior to the first day of the semester. Proof of successful completion is required.

Transcripts

Upon acceptance, final and official transcripts from all colleges and universities attended, and/or final and official documents, must be received within 90 calendar days from the start of the semester. If not received by that time, the student will not be allowed to continue class attendance. Financial aid will not be disbursed until all required documents are received and the student is fully admitted.

Foreign Coursework

Applicants who have completed coursework outside of the U.S. must request an official foreign evaluation report from World Education Services, Inc. (WES) or Educational Credential Evaluators (ECE). Please request a course-by-course foreign transcript evaluation report (FTER), with an overall GPA calculation, sent directly from WES or ECE to PharmGrad.

- World Education Services, Inc.
(212) 966-6311 • 800-361-3106 • wes.org

- *By Postal Mail*

WES Reference #
WES Global Documentation Centre
PO Box 2008 STN MAIN
Newmarket, ON, L3Y 0G5
Canada

- *By Express Courier*

WES Reference #
WES Global Documentation Centre
14-145 Industrial Parkway South
Aurora, ON, L4G 3V5
Canada

- Educational Credential Evaluators, Inc.
101 West Pleasant Street, Suite 200
Milwaukee, WI 53212-3963
(414) 289-3400 • ece.org

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All admissions materials and foreign evaluations sent to Nova Southeastern University must be mailed to

- Nova Southeastern University
Enrollment Processing Services (EPS)
College of Pharmacy Admissions
3300 S. University Drive, PO Box 299000
Fort Lauderdale, FL 33328-2004

Program Requirements

All students must purchase an iPad or personal computer for assignments and assessments and have an active account with an Internet service provider. In addition, students must have ongoing access to a computer capable of connecting to the Internet and playing streaming video files. Online course notes and discussions will be provided to the student through an online course management system. NSU will provide access to email, online databases, and library resources.

Tuition: M.S. in Pharmaceutical Sciences Program

All tuition and fees are subject to change by the board of trustees without notice.

Annual tuition will be posted online at pharmacy.nova.edu.

Fees, Expenses, and Deposit— All Programs

- Acceptance and Preregistration Deposit—\$1,000. This deposit is required to reserve the accepted applicant’s place in the entering, first-year class. The deposit will be deducted from the tuition payment due on registration day, but is not refundable in the event of a withdrawal. It is due within three weeks of an applicant’s acceptance.
- Pharmacy General Access Fee—\$145 per annum.
- NSU Student Services Fee—\$1,800 per annum.
- Late Payment Fee—\$100. All tuition and fees not paid within 30 days after the start of the semester will incur this fee.
- BJSCOP Fees and Expenses—Additional fees and expenses may be incurred for college-approved activities. These fees and expenses are estimated at \$1,000 over the course of the program.

The first semester’s tuition and fees, less the nonrefundable, \$1,000 deposit, are due on or before the first day of classes. Tuition for each subsequent semester is due on or before the first day of classes. Students will not be permitted to register or attend classes until their financial obligations have been met. The financial ability of applicants to complete their training at the college is important. Applicants should have specific plans for financing their professional education. This should include tuition, fees, iPad or personal computer, computer-related expenses, health insurance, books, printing, required equipment, and living and other miscellaneous expenses.

Each student is required to carry adequate personal medical and hospital insurance. For more information about NSU's required health insurance, visit the website at nova.edu/bursar/health-insurance.

Course of Study

The two-year degree program will provide a strong science foundation for those interested in doctoral-level graduate programs in pharmacy and other science fields. Students will be better prepared to further pursue the doctoral-level career paths currently being offered nationwide.

Some courses may be offered in a hybrid model, which includes synchronous and asynchronous online learning, as well as on-campus learning and videoconferencing. Some courses will be combined with existing graduate courses, while others will be stand-alone, master's degree-specific courses. M.S. students may be assessed differently when appropriate. Each sequence has courses and emphasis specific to its discipline.

International/Student Visa Information

It is the applicant's responsibility to contact the Office of International Students and Scholars for information on immigration regulations and student visa requirements at

- Nova Southeastern University
Attention: Office of International Students and Scholars
3300 S. University Drive
Fort Lauderdale, FL 33328-2004

(954) 262-7240
800-541-6682, ext. 27240
Fax: (954) 262-3846
Email: intl@nsu.nova.edu
nova.edu/internationalaffairs

Graduation Requirements

To receive a degree, students must fulfill the following requirements:

- be of good moral character
- successfully complete all curricular requirements and assessments with a minimum cumulative GPA of 3.0 on a 4.0 scale within four academic years
- satisfactorily meet all financial, library, and university obligations (to receive credentials)
- submit an application for degree/diploma to the registrar's office by the posted deadline

Curriculum Outlines

These courses are representative of the overall requirements of the program at the time of publication and are subject to change. Updates to the curriculum will be posted online at pharmacy.nova.edu.

Molecular Medicine and Pharmacogenomics

First and Second Years			Credits
PHRM	5004	Advanced Physical Pharmacy	3
PHRM	5012	Clinical Drug Development: Advanced Pharmacokinetics and Biopharmaceutics	3
PHRM	5014	Molecular and Cellular Pharmacodynamics	3
PHRM	5020	Advanced Pharmacogenomics and Molecular Medicine	3
PHRM	5030	Biostatistics	3
PHRM	5060	Pharmaceutical Sciences Research Design	1
PHRM	5204	Research Techniques and Instrumentation	3
PHRM	5212	Bioethical Principles of Life Science Research	3
PHRM	5610	Scientific Writing	1
PHRM	5700	Research Project	4
PHRM	5701	Graduate Seminar*	4
PHRE		Electives	6
Total Credits			37

Drug Development (Pharmaceutics)

First and Second Years			Credits
PHRM	5004	Advanced Physical Pharmacy	3
PHRM	5012	Clinical Drug Development: Advanced Pharmacokinetics and Biopharmaceutics	3
PHRM	5014	Molecular and Cellular Pharmacodynamics	3
PHRM	5030	Biostatistics	3
PHRM	5060	Pharmaceutical Sciences Research Design	1
PHRM	5204	Research Techniques and Instrumentation	3
PHRM	5212	Bioethical Principles of Life Science Research	3
PHRM	5229	Product Development and Industrial Pharmacy	4
PHRM	5610	Scientific Writing	1
PHRM	5700	Research Project	4
PHRM	5701	Graduate Seminar*	4
PHRE		Electives	6
Total Credits			38

Social and Administrative Pharmacy

First and Second Years

			Credits
PHRM	5001	Health Economics	3
PHRM	5021	Population Health and Public Policy	3
PHRM	5025	Pharmacy Management and Finance	3
PHRM	5030	Biostatistics	3
PHRM	5203	Social Measurement and Techniques	3
PHRM	5209	Pharmacoeconomics	3
PHRM	5211	Theories of Health-Seeking Behavior	3
PHRM	5212	Bioethical Principles of Life Science Research	3
PHRM	5610	Scientific Writing	1
PHRM	5700	Research Project	4
PHRM	5701	Graduate Seminar*	4
PHRE		Elective	3
Total Credits			36

*repeatable course

Master of Science (M.S.) in Pharmaceutical Sciences Course Descriptions

Note: Listed at the end of each entry are lecture hours, laboratory hours, and credit hours.

PHRM 5001—Health Economics

This course will introduce students to the economic analysis of health care markets and the production of health. This course covers a variety of topics, including the determinants of health; the supply of, and demand for, health care services; the impact of insurance on the demand for health care services; the role of government in health care markets; the market for pharmaceuticals; and the economic evaluation of health care programs. **(48-0-3)**

PHRM 5004—Advanced Physical Pharmacy

This course presents application of underlying physical principles to formulate and to develop various pharmaceutical products. It describes physical principles in both solid and non-solid states. Students will learn how basic physical principles are applied in development of current and novel pharmaceutical solids, semi-solids, homogeneous, and heterogeneous systems. This course describes the importance, properties, and applications of different polymer systems, new drug carriers, and rheology modifiers in developing current and novel dosage forms. Drug stability and solubility and approaches to enhance the solubility of the poorly soluble drugs will also be discussed. **(48-0-3)**

PHRM 5012—Clinical Drug Development: Advanced Pharmacokinetics and Biopharmaceutics

This course deals with the principles that explain the processes of absorption, distribution, and elimination of drugs. The advances in pharmacokinetic modeling, compartmental analysis, model-independent methods, single and multiple dosing, protein binding, metabolite kinetics, interspecies scaling to translate animal data to humans, effect of disease states, and data analysis using relevant software will be discussed, as will applying the principles of biopharmaceutics and pharmacokinetics to the design of controlled release and targeted drug delivery systems. Emphasis is on bioequivalence and bioavailability of traditional pharmaceutical dosage forms and novel drug delivery systems, including the assessment of biosimilars. **(48-0-3)**

PHRM 5014—Molecular and Cellular Pharmacodynamics

This course studies the considerations in operating and regulating cellular processes by manipulating receptors for therapeutic advantage through coupled signaling pathways. Recent developments in this technique, as it applies to the treatment of disease, will be presented. **(48-0-3)**

PHRM 5020—Advanced Pharmacogenomics and Molecular Medicine

This course is designed to educate students with an in-depth knowledge and understanding of the cellular and molecular bases that have evolved as the basis of human diseases. The course offers the contemporary molecular biological concepts to apply toward understanding molecular bases of individual variation, their application to drug response, and possible new interventions. Students will be able to understand and apply the knowledge of modern molecular biological techniques for diagnostics and detection of infection, gene defects, and fingerprinting; transgenesis; biopharming; immunotherapies; and the ever-developing field of gene therapy and regenerative medicine. **(48-0-3)**

PHRM 5021—Population Health and Public Policy

This graduate-level, interactive course introduces students to: (1) the fundamental concepts and frameworks used for the study of population health and public policy; (2) the financing and managing of health systems at the local and international levels; and (3) the formulation and analysis of public health policies. The course will emphasize the intersection of public health and the determinant of drug use and pharmacy-related policies. Students will have the opportunity to analyze and critically evaluate existing health policies, public health actions, and reforms. The course will be highly interactive. Students are expected to contribute and participate in the discussion of current research, case studies, and policies. Student learning will be assessed through oral exams, written assignments, presentations, and an analytical paper. This course will provide skills for the conceptualization of research projects addressing current health issues related to pharmacy. **(48-0-3)**

PHRM 5025—Pharmacy Management and Finance

This course provides an overview of management theories, human resources, and financial management applied to pharmacy and health care institution operations. Elements of supervision, management, and leadership are discussed in an effort to help students develop the skills needed to operate a pharmacy effectively. Also covered are finance topics such as capital costs, profit analysis, cost structures, budgeting, payment for services rendered, and accounting. **(48-0-3)**

PHRM 5030—Biostatistics

This course introduces methods for presenting data in summary form, analyzing data, and designing experiments. It emphasizes the application of statistical ideas and methods to the analysis and interpretation of experiments and comparative data. Students will be able to assess a situation involving data analysis, state the null and alternative hypotheses proposed, decide on the correct statistical procedure to test the null

hypothesis and the assumptions of the test used, calculate the statistic, assess its statistical significance, and interpret the data in light of the calculated results. **(48-0-3)**

PHRM 5060—Pharmaceutical Sciences Research Design

This course provides an analysis of the study designs most commonly employed in experimental research, with emphasis in basic and clinical pharmacological research. Upon completion of the course, students will understand the considerations that go into selecting qualitative, quantitative, and mixed methods of research design. The course prepares students to select the most appropriate design to better answer a specific research question, as well as to understand the strengths and limitations of such a design. **(16-0-1)**

PHRM 5203—Social Measurement and Techniques

This course introduces students to the concepts of advanced measurement theory and methods used in research. It acquaints students with cutting-edge models in measurement theory and methods, as well as with the application of computer software with which to implement those methodologies. After completing the course, students should be prepared to begin working on advanced applications of measurement in the sociobehavioral sciences. **(48-0-3)**

PHRM 5204—Research Techniques and Instrumentation

This course will provide students with a broad overview of technologies and instruments used in pharmaceutical sciences research. Topics covered include the fundamentals of spectroscopy and chromatography, basic protein and molecular biology techniques, and others. The course will allow students to read the literature with greater understanding as methodological terminology begins to have more meaning. **(48-0-3)**

PHRM 5209—Pharmacoeconomics

This course provides an overview of pharmacoeconomics and some of the health outcome measurements that apply to health/pharmacy-related disciplines. The course is designed to focus on methodological principles of pharmacoeconomics analyses and the strengths and weaknesses of specific methods. Practical examples for successful implementation of these concepts are discussed. **(48-0-3)**

PHRM 5211—Theories of Health-Seeking Behavior

This course covers social and behavioral theories related to medication use, health services utilization, provider-patient communication, and other health-seeking behaviors. Students will examine and apply select health behavior theories at the individual, interpersonal, and community level. They will examine research conducted using the theories, with emphasis in the pharmacy field. Students are expected to apply theories in defining research questions, research design, and data analysis. **(48-0-3)**

PHRM 5212—Bioethical Principles of Life Science Research

This course will provide an understanding of the ethical issues associated with life science research, acculturate students to the mores of the life science research community, discuss issues related to the use of animals and human subjects in research, develop skills for communicating life science research to diverse audiences, and allow students to develop the skills needed to be successful life science researchers. **(48-0-3)**

PHRM 5229—Product Development and Industrial Pharmacy

This course provides the student with the essential information about the various stages of the new drug approval process and drug development, including preformulation, comparison studies, suitability of pharmaceutical excipients, and formulation. Additionally, it provides the student with the principles of pharmaceutical processing, such as filtration, milling, mixing, drying, and compression of pharmaceutical solids. The course also deals with the production and quality control of tablets, capsules, liquid dosage forms, semi-solid dosage forms, and sterile products. Coverage includes the science of packaging materials, production management, quality assurance, and regulations in the pharmaceutical industry, including validation, good manufacturing practice, and FDA guidelines for stability of pharmaceutical dosage forms. **(64-0-4)**

PHRM 5610—Scientific Writing

This course exposes students to, and provides practice in, various types of writing skills necessary for scientists and researchers, including research logs, internal reports, technical reports, abstracts, presentations and journal manuscripts, dissertation formats, and grant applications. Students are exposed to various search databases, style manuals, and publication outlets. **(16-0-1)**

PHRM 5700—Research Project

Under the direction of faculty members, students will craft a mentored research project that draws on the educational experiences of their specialized track and electives. This research is provided to develop increased independence for students, while still maintaining the structure and faculty member oversight necessary to ensure that learning goals are met. The research may be a combination of classroom, laboratory, field, or in silico study. This supervised experience will allow students to work on projects that complement classroom work in the context of a structured course. The project will be designed to include practical instruction on evidence-based study development, data collection, and scientific writing. **(64-0-4)**

PHRM 5701—Graduate Seminar

This course will equip students with the necessary tools to prepare and present lucid reports on their own research, as well as the research of others. The course will consist of weekly lectures that will be required of all graduate students throughout their course of study and research. Speakers will include faculty members and guests, as well as students presenting aspects of their research. **(16-0-1)**

PHRE (Elective) Courses**PHRE 5023—Pharmaceutical Marketing**

This course is intended to provide graduate students with an in-depth understanding of the global development and marketing of pharmaceuticals, with an emphasis on the U.S. system. **(48-0-3)**

PHRE 5036—Patent and Litigation

This course teaches students the basics of patent laws, patent structure, patent literatures, patenting process/evaluation, and patent invalidity/infringement/litigations. It is focused only on pharmaceutical patents, and the students are expected to learn the basics by reviewing and practicing real case patenting and litigation studies. Since novelty and innovation are integral tasks of a pharmaceutical formulation scientist, this course will help students to successfully patent and prosecute their novel research. **(48-0-3)**

PHRE 5108—Current Topics in Pharmaceutical Sciences

This course covers special topics selected by faculty members and visiting scientists. The goal of each topic is to provide students with an understanding of, and an appreciation for, current problems and procedures underlying the pharmaceutical sciences discipline. **(48-0-3)**

PHRE 5120—Research Design

This course provides an overview of research design. It covers understanding the preliminary considerations that go into selecting a research design. These include considering philosophical world views; reviewing the literature; understanding the use of theory; sampling; measurement; pre-experimental, correlational, or experimental design; data collection; and data analysis strategies. Discussions on the process of research as it relates to each approach will be included. This process includes writing an introduction; specifying a purpose statement; developing research questions and/or hypotheses; and proposing methods, including data collection and analysis plans. Faculty permission is required. **(48-0-3)**

PHRE 5207—Secondary Data Analysis of Pharmacy-Related Sources

This course guides students through the intricacies of utilizing secondary data for research. The emphasis is on utilizing sources of previously collected data that deal with pharmacy-

related issues, including administrative, sociobehavioral, and clinical themes. Methodological issues arising from the various analytic approaches (e.g., meta-analysis, case-control analysis, content analysis) will be identified and discussed. **(48-0-3)**

PHRE 5209—Advanced Pharmacokinetics

This course explains the model development techniques that can be utilized for complex pharmacodynamics systems. Advanced data analysis techniques and modern pharmacokinetic theory will be discussed in conjunction with PK/PD literature. **(48-0-3)**

PHRE 5210—Modern Medicine

This course aims to integrate various multidisciplinary domains of science and technology to address the development and translation of advanced, multifunctional pharmaceuticals for targeted therapy of specific organs/tissues/cells in hard-to-treat diseases. It describes different types of smart, multifunctional drug delivery systems (DDSs) and drug delivery devices (DDD) using various advanced nanobiomaterials. The course elaborates on the applications of nanoscale, multimodal DDSs/DDDs in targeted therapy of detrimental diseases, such as solid tumors. It outlines cell-/tissue-specific targeted therapy and provides overviews on the applications of theranostics for simultaneous diagnosis and therapy. **(48-0-3)**

PHRE 5213—Epidemiology of Drug Use, Abuse, and Misuse

This course is designed to introduce doctoral students to the epidemiology of drug use, misuse, and abuse. The course focuses on drug use, misuse, and abuse as social phenomena and deals with the history of drug use and regulatory attempts in America; pharmacology and use patterns related to specific drugs; use, abuse, and misuse as medical, psychological, and social concepts; drug importation, manufacture, and distribution (including both the legal and illegal drug industries); perspectives on the etiology of drug use/abuse; drug abuse prevention and educational programs; and approaches to drug abuse treatment. **(48-0-3)**

PHRE 5216—Pharmaceutical Polymers

This course presents basic concepts and properties of polymers as related to formulation, development, and design of pharmaceutical dosage forms and products. It describes how basic principles of polymers—structural, physical, chemical, and mechanical properties—can be utilized in modifying and developing current and novel pharmaceutical products. The course highlights important areas of polymer applications in controlled drug delivery, targeted drug delivery, tissue engineering, nanotechnology, and medical devices. **(48-0-3)**

PHRE 5222—Applied Pharmacology

Students will use pharmacological principles to study the effects of therapeutic agents on the central nervous system, the endocrine system, the gastrointestinal system, blood, and blood-forming organs. It will address the rationale for the use of therapeutic agents; their effects on cells, tissues, organ systems, and patients; the mechanisms underlying these effects; the therapeutic value of specific drug effects; the limitation of the use of the agents; and the adverse effects of drugs. **(48-0-3)**

PHRE 5224—Drugs of Abuse

This course covers types of substances abused, methods and routes of administration, the pertinent toxicokinetics, the pharmacological/toxicological mechanisms, and the clinical manifestations of drug abuse. The anatomical and neurochemical substrates of drugs of abuse are also described. Treatment of intoxication and withdrawal, societal impact of drug abuse, legal implications, and current trends of substance abuse are addressed as well. **(48-0-3)**

PHRE 5244—Fundamentals of Pharmacognosy

This course provides an overview of medicinal drugs derived from plants and other natural sources. The major classes of medicinally active natural products, their origin (nomenclature+taxonomy), structure, biosynthesis, and mode of action will be covered. The naturally derived constituents and their therapeutic efficacy will be discussed. **(48-0-3)**

PHRE 5351—Contemporary Issues in Pharmacy

This course is designed to explore a broad spectrum of contemporary issues related to pharmacy practice, the pharmaceutical industry, third-party payment, and health policy. It will also increase student awareness and understanding of changes in pharmacy practices and its impact on the U.S. health care system. **(48-0-3)**

PHRE 5432—Oncologic Treatments and Pharmacogenomics

This course introduces the basic molecular concepts of cancer and pharmacogenomics in the context of cancer treatment. It presents the current methodologies used in cutting-edge oncology for the treatment of two of the most common types of cancer: breast and colon. The standard-of-care combinatorial regimens will be presented, as well as the treatment scenarios that are applied to advanced-stage and recurrent disease. Drugs that have increased patient tolerance to these genotoxic regimens will also be discussed. Finally, the application of next-generation sequencing of tumor DNA or RNA to determine which of the more than 300 druggable mutations exist in these tumors will be discussed, primarily in the cancer recurrence setting. Prognostic tests based on RNA expression from tumors will be covered. Discussion of the rationale for insurance coverage of pharmacogenomics will also be covered. The impact of oncologic pharmacogenomics on future clinical trials will be examined. **(48-0-3)**

PHRE 5516—Health Disparities in Chronic Diseases: The Role of the Pharmacist

This course presents the main causes and pathways to health disparities in the United States. It focuses on chronic diseases, such as diabetes, cancer, and cardiovascular diseases. Emphasis is given to disparities associated with access to medication and pharmacy services and to adherence. Students learn about pharmacy-led interventions aimed at reducing health disparities. They are expected to use epidemiological data to study the disparities and to formulate recommendations to the pharmacy field. Students are assessed through hands-on structured assignments. **(48-0-3)**

PHRE 5999—Research in the Pharmaceutical Sciences

In this course, students work under the direction/supervision of one or more faculty members in a research laboratory. Students are involved in planning and executing an approved research project using basic techniques of scientific research. Students will be awarded 3 or 4 semester credits on the basis of 48 laboratory hours per credit. **(0-[144-192]-[3-4])**

Doctor of Philosophy (Ph.D.) in Pharmaceutical Sciences

Admissions Requirements

Candidates with degrees in fields related to the sciences will be considered for the Ph.D. in Pharmaceutical Sciences program. The College of Pharmacy takes a holistic approach in the evaluation of applications, looking beyond grades and test scores, but also focusing on work history, extracurricular activities, and life experiences. Students in the Ph.D. program are eligible to apply for a concurrent degree in the M.S. in Pharmaceutical Sciences program.

Students applying to the Drug Development (Pharmaceutics) or the Molecular Medicine and Pharmacogenomics sequences are required to have earned **a Bachelor of Science degree in pharmacy, chemistry, biology, or a related scientific area**. Students applying to the Social and Administrative Pharmacy sequence are required to have earned **a Bachelor of Science degree in pharmacy, economics, statistics, public health, health services research, or other related fields**.

1. Applicants must have earned a baccalaureate degree from a regionally accredited institution of higher education.
2. Applicants must have earned a minimum cumulative GPA of 3.0 on a 4.0 scale.
3. Applicants must submit official scores from the Graduate Record Examination (GRE) general test (verbal reasoning, quantitative reasoning, and analytical writing).
 - Scores must be **less than five years old** at the time of application.
 - For more information, please visit gre.org.
4. Three letters of reference from professors or supervisors in the applicant's field of study must be submitted.

Application Procedures

The Office of Admissions processes applications on a rolling basis; therefore, it is in the best interest of the applicant to apply early. The PharmGrad application process may take up to six weeks to complete.

1. Apply to PharmGrad electronically through Pharmgrad.org.
 - application deadline: **June 30**
2. Send supporting documents to PharmGrad.
 - official transcripts from all colleges and universities attended (submitted directly to PharmGrad by the college or university and/or foreign credential evaluation service)
 - three letters of reference on official letterhead, with a signature, from professors or supervisors in the applicant's field of study

- official GRE scores (optional)
- proof of English proficiency (required for non-native English speakers)

The following standardized tests currently satisfy NSU Barry and Judy Silverman College of Pharmacy English requirements for non-native English speakers:

- Test of English as a Foreign Language (TOEFL): minimum score of 80 on the Internet-based test or 213 on the computer-based test (toefl.org)
- International English Language Testing System (IELTS): minimum score of 6.0 on the test module (ielts.org)
- Duolingo Test of English: minimum score of 105 (duolingo.com)

** Scores may be no more than **two** years old at the time of the interview.*

Candidates may also demonstrate English proficiency by successfully completing a baccalaureate, master's, or professional degree in the United States or two college-level English composition courses at a regionally accredited college or university with a minimum cumulative GPA of 2.0 on a 4.0 scale.

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Notice of Acceptance

Notice of acceptance or other action by the Committee on Admissions will be on a "rolling" or periodic schedule. Early completion of the application process is in the best interest of the applicant. Admission to the program is contingent upon successful completion of all prerequisite coursework prior to the first day of the semester. Proof of successful completion is required.

Transcripts

Upon acceptance, final and official transcripts from all colleges and universities attended, and/or final and official documents, must be received within 90 calendar days from the start of the semester. If not received by that time, the student will not be allowed to continue class attendance. Financial aid will not be distributed until all required documents are received and the student is fully admitted.

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Applicants who have completed coursework outside of the U.S. must request an official foreign evaluation report from World Education Services, Inc. (WES) or Educational Credential Evaluators (ECE). Please request a course-by-course foreign transcript evaluation report (FTER), with an overall GPA calculation, sent directly from WES or ECE to PharmGrad.

- World Education Services, Inc.
(212) 966-6311 • 800-361-3106 • wes.org

- *By Postal Mail*

WES Reference #
WES Global Documentation Centre
PO Box 2008 STN MAIN
Newmarket, ON, L3Y 0G5
Canada

- *By Express Courier*

WES Reference #
WES Global Documentation Centre
14-145 Industrial Parkway South
Aurora, ON, L4G 3V5
Canada

- Educational Credential Evaluators, Inc.
101 West Pleasant Street, Suite 200
Milwaukee, WI 53212-3963
(414) 289-3400 • ece.org

It is the applicant's responsibility to have this coursework evaluated. An official course-by-course evaluation with a cumulative grade point average must be sent directly from the evaluation service to PharmGrad.

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Enrollment Processing Service
3300 S. University Drive, PO Box 299000
Fort Lauderdale, FL 33328-2004

Tuition: Ph.D. Program

All tuition and fees are subject to change by the board of trustees without notice.

Annual tuition will be posted online at pharmacy.nova.edu.

Fees, Expenses, and Deposit— All Programs

- Acceptance and Preregistration Deposit—\$1,000. This deposit is required to reserve the accepted applicant's place in the entering, first-year class. This deposit will be deducted from the tuition payment due on registration day, but is not refundable in the event of a withdrawal. It is due within three weeks of an applicant's acceptance.
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Attention: Office of International Students and Scholars
3300 S. University Drive
Fort Lauderdale, FL 33328-2004

(954) 262-7240
800-541-6682, ext. 27240
Fax: (954) 262-3846
Email: intl@nsu.nova.edu
nova.edu/internationalaffairs

Graduation Requirements

To receive a Ph.D. degree, students must fulfill the following requirements:

- be of good moral character
- successfully complete the requirements of the curriculum within seven academic years with a minimum cumulative GPA of 3.0 on a 4.0 scale
- have one first-author publication (accepted, in-press, or published)
- successfully defend their dissertation research to the satisfaction of the Dissertation Committee (dissertation defense) and present a bound dissertation copy to the associate dean of graduate programs
- satisfactorily meet all financial, library, and university obligations (to receive credentials)
- submit an application for degree/diploma to the registrar's office by the posted deadline

Program Description

Entering pharmacy graduate students must select one of three sequences to focus their graduate studies upon: Social and Administrative Pharmacy, Drug Development (Pharmaceutics), or Molecular Medicine and Pharmacogenomics. Research topics available to students are consistent with the expertise of faculty members in the Barry and Judy Silverman College of Pharmacy (BJSCOP) at NSU. In addition, the Ph.D. program is consistent with the criteria for accreditation set by the Commission on Colleges of the Southern Association of Colleges and Schools.

Social and Administrative Pharmacy Sequence

Overview

This sequence focuses on knowledge and research skills that deal with the dynamics and complex nature of drug use and distribution systems. Students who pursue this sequence are advised and mentored by faculty members from the Department of Sociobehavioral and Administrative Pharmacy, a group of scholars whose specialties include, among others, pharmacoconomics and outcomes research, the economics of pharmacy, pharmacoepidemiology, data analytics, health disparities and special populations, cultural competency, patients' decision-making, public policy, social and behavioral pharmacy, biostatistics, and pharmacy administration (management, marketing, and finance). Students are expected to complete original dissertation research in the intersection of any of these areas with medication use.

Course of Study

Students are required to take a minimum of 60 credits, at least 36 of which must be in didactic coursework. A minimum cumulative GPA of 3.0 must be maintained. Coursework aimed at filling academic gaps in a student's background will not count toward program requirements. Both a written or comprehensive and an oral qualifying examination are required to advance to candidacy. Research, culminating in a successfully defended dissertation, is required of all students in their respective areas. Some courses may be offered in a hybrid model, which includes synchronous and asynchronous online learning, as well as on-campus learning and videoconferencing.

At the completion of this course of study and research, students will

- demonstrate the knowledge base expected at the Ph.D. level in their specialty
- design and conduct independent research that adds to the understanding of their specialty
- prepare and defend rational and structured proposals seeking support for their research
- effectively communicate the results of their own research
- be competitive for careers in academia, industry, government, or regulatory positions

Social and Administrative Pharmacy Curriculum Sequence

These courses are representative of the overall requirements of the program at the time of publication and are subject to change. Updates to the curriculum will be posted online at *pharmacy.nova.edu*.

First and Second Years			Credits
PHRP	7001	Health Economics	3
PHRP	7021	Population Health and Public Policy	3
PHRP	7023	Pharmaceutical Marketing	3
PHRP	7025	Pharmacy Management and Finance	3
PHRP	7110	Bioethical Principles of Life Science Research	3
PHRP	7120	Research Design	3
PHRP	7203	Social Measurement and Techniques	3
PHRP	7209	Pharmacoeconomics	3
PHRP	7211	Theories of Health-Seeking Behavior	3
PHRP	7243	Research Design II	3
PHRP	7320	Advanced Biostatistics I	3
PHRP	7330	Advanced Biostatistics II	3
PHRP	7610	Scientific Writing	1
PHRP	7620	Research Funding and Proposal Development	1
PHRP	8301	Graduate Research*	12
PHRP	8400	Graduate Seminar*	4
PHRE		Elective(s)	3

Third Year			Credits
PHRP	8000	Dissertation Research [#]	24
PHRP	8301	Graduate Research*	3
PHRP	8400	Graduate Seminar*	2
PHRE		Elective(s)	6

Fourth Year[#]			Credits
PHRP	8000	Dissertation Research [#]	24
PHRP	8400	Graduate Seminar*	2
PHRP	8900	Dissertation Defense ⁺	8

**repeatable course*

[#]Additional years may be required to complete the dissertation research. The curriculum for subsequent years is identical to the fourth year (maximum seven years allowed for Ph.D. completion).

⁺This course is only available to students in their final semester.

Notes: • Qualifying exams will commence during the summer semester of the second year.

• Graduation from the program requires the preparation and successful defense of a dissertation.

Drug Development (Pharmaceutics) Sequence

Overview

This sequence emphasizes the development of laboratory research skills and supporting coursework that are integral to the theory and practice associated with the incorporation of drug entities into the forms and formulations to achieve the most effective delivery of drugs to the site of biological and medical action. Students who pursue this track will be primarily under the tutelage of faculty members in the Department of Pharmaceutical Sciences, a group of researchers with expertise in pharmaceutics-related disciplines. Particular areas of expertise include a variety of drug formulations, such as abuse-resistant formulations, novel drug delivery approaches, and molecularly targeted drug delivery systems.

Course of Study

Students are required to take a minimum of 60 credits, at least 36 of which must be in didactic coursework. A minimum cumulative GPA of 3.0 must be maintained. Coursework aimed at filling academic gaps in a student's background will not count toward program requirements. Both a written

or comprehensive and an oral qualifying examination are required to advance to candidacy. Research, culminating in a successfully defended dissertation, is required of all students in their respective areas. Some courses may be offered in a hybrid model, which includes synchronous and asynchronous online learning, as well as on-campus learning and videoconferencing.

At the completion of this course of study and research, students will

- demonstrate the knowledge base expected at the Ph.D. level in their specialty
- design and conduct independent research that adds to the understanding of their specialty
- prepare and defend rational and structured proposals seeking support for their research
- effectively communicate the results of their own research
- be competitive for careers in academia, industry, government, or regulatory positions

Drug Development (Pharmaceutics) Curriculum Sequence

These courses are representative of the overall requirements of the program at the time of publication and are subject to change. Updates to the curriculum will be posted online at pharmacy.nova.edu.

First and Second Years			Credits
PHRP	7004	Advanced Physical Pharmacy	3
PHRP	7012	Clinical Drug Development: Advanced Pharmacokinetics and Biopharmaceutics	3
PHRP	7030	Biostatistics	3
PHRP	7060	Pharmaceutical Sciences Research Design	1
PHRP	7110	Bioethical Principles of Life Science Research	3
PHRP	7204	Research Techniques and Instrumentation	3
PHRP	7229	Product Development and Industrial Pharmacy	4
PHRP	7610	Scientific Writing	1
PHRP	7620	Research Funding and Proposal Development	1
PHRP	8250	Advanced Topics in Pharmaceutical Sciences**	2
PHRP	8301	Graduate Research*	18
PHRP	8400	Graduate Seminar*	4
PHRE		Elective(s)	6

Third Year			Credits
PHRP	8100	Dissertation Research [#]	24
PHRP	8250	Advanced Topics in Pharmaceutical Sciences*	1
PHRP	8400	Graduate Seminar*	2

Fourth Year [#]			Credits
PHRP	8100	Dissertation Research [#]	24
PHRP	8400	Graduate Seminar*	2
PHRP	8900	Dissertation Defense ⁺	8

**repeatable course*

[#]Additional years may be required to complete the dissertation research. The curriculum for subsequent years is identical to the fourth year (maximum seven years allowed for Ph.D. completion).

⁺This course is only available to students in their final semester.

Note: Graduation from the program requires the preparation and successful defense of a dissertation.

Molecular Medicine and Pharmacogenomics Sequence

Overview

This sequence emphasizes laboratory research and the development of research skills that are integral to elucidation of the mechanism of action of drugs, and the extent and characteristics of those actions. Students who pursue this sequence will be primarily under the tutelage of faculty members in the Department of Pharmaceutical Sciences, a group of researchers with expertise in pharmacology, medicinal chemistry, toxicology, neuroscience, and biochemistry. Particular areas of expertise include cardiovascular pharmacology, molecular pharmacology, central nervous system diseases, and cancer pharmacology.

Course of Study

Students are required to take a minimum of 60 credits, at least 36 of which must be in didactic coursework. A minimum cumulative GPA of 3.0 must be maintained. Coursework aimed at filling academic gaps in a student's background will not count toward program requirements. Both a written or comprehensive and an oral qualifying examination are required

to advance to candidacy. Research, culminating in a successfully defended dissertation, is required of all students in their respective areas. Some courses may be offered in a BlendFlex model, which includes synchronous and asynchronous online learning, as well as on-campus learning and videoconferencing.

At the completion of this course of study and research, students will

- demonstrate the knowledge base expected at the Ph.D. level in their specialty
- design and conduct independent research that adds to the understanding of their specialty
- prepare and defend rational and structured proposals seeking support for their research
- effectively communicate the results of their own research
- be competitive for careers in academia, industry, government, or regulatory positions

Molecular Medicine and Pharmacogenomics Curriculum Sequence

These courses are representative of the overall requirements of the program at the time of publication and are subject to change. Updates to the curriculum will be posted online at *pharmacy.nova.edu*.

First and Second Years			Credits
PHRP	7006	Advanced Pharmacology	4
PHRP	7012	Clinical Drug Development: Advanced Pharmacokinetics and Biopharmaceutics	3
PHRP	7020	Experimental Statistics and Informatics	1
PHRP	7030	Biostatistics	3
PHRP	7060	Pharmaceutical Sciences Research Design	1
PHRP	7110	Bioethical Principles of Life Science Research	3
PHRP	7114	Molecular and Cellular Pharmacodynamics	3
PHRP	7204	Research Techniques and Instrumentation	3
PHRP	7220	Advanced Pharmacogenomics and Molecular Medicine	3
PHRP	7222	Applied Pharmacology	3
PHRP	7226	Journal Club	1
PHRP	7610	Scientific Writing	1
PHRP	7620	Research Funding and Proposal Development	1
PHRP	8301	Graduate Research*	18
PHRP	8400	Graduate Seminar*	4
PHRE		Elective(s)	6

Third Year			Credits
PHRP	8200	Dissertation Research [#]	24
PHRP	8400	Graduate Seminar*	2

Fourth Year[#]			Credits
PHRP	8200	Dissertation Research [#]	24
PHRP	8400	Graduate Seminar*	2
PHRP	8900	Dissertation Defense ⁺	8

**repeatable course*

[#]Additional years may be required to complete the dissertation research. The curriculum for subsequent years is identical to the fourth year (maximum seven years allowed for Ph.D. completion).

⁺This course is only available to students in their final semester.

Note: Graduation from the program requires the preparation and successful defense of a dissertation.

Ph.D. Course Descriptions

Note: Listed at the end of each entry are lecture hours, laboratory hours, and credit hours.

PHRP 7001—Health Economics

This course will introduce students to the economic analysis of health care markets and the production of health. This course covers a variety of topics, including the determinants of health; the supply of, and demand for, health care services; the impact of insurance on the demand for health care services; the role of government in health care markets; the market for pharmaceuticals; and the economic evaluation of health care programs. This course focuses on the application of economic analysis as it relates to provision of health care and emerging health care trends in the United States and throughout the world. It also focuses on understanding how health care markets differ from other markets, specifically on the economics of the health care sector and its major players (e.g., the government, insurers, providers, and patients). Economic concepts and tools will be used to analyze the health care system and to examine implications and issues in health policy. **(48-0-3)**

PHRP 7004—Advanced Physical Pharmacy

This course presents application of underlying physical principles to formulate and develop various pharmaceutical products. It describes physical principles in both solid and non-solid states. Students will learn how basic physical principles are applied in development of current and novel pharmaceutical solids, semi-solids, and homogeneous and heterogeneous systems. Moreover, the course describes the importance, properties, and application of different polymer systems, new drug carriers, and rheology modifiers in developing current and novel dosage forms. Drug stability and solubility and approaches to enhance the solubility of poorly soluble drugs will also be discussed. **(48-0-3)**

PHRP 7006—Advanced Pharmacology

This course will apply the principles of organic chemistry, biochemistry, physiology, and pathophysiology to understand drug actions at the receptor, cellular, and systems levels under physiological and pathological conditions. Special emphasis will be placed on students' understanding of determinants of drug absorption, distribution, physiological receptors, drug-receptor interaction, drug metabolism, and elimination. This course will also focus on the drugs that act on the autonomic nervous system, cardiovascular system, and blood components as well. The rationale for the use of these therapeutic agents; their effects on cells, tissues, organ systems, and patients; the mechanisms underlying these effects; the therapeutic value of specific drug effects; and the adverse effects of the drugs will be addressed as well. **(64-0-4)**

PHRP 7012—Clinical Drug Development: Advanced Pharmacokinetics and Biopharmaceutics

This course deals with the principles that explain the processes of absorption, distribution, and elimination of drugs. The advances in pharmacokinetic modeling, compartmental analysis, model-independent methods, single and multiple dosing, protein binding, metabolite kinetics, interspecies scaling to translate animal data to humans, effect of disease states, and data analysis using relevant software will be discussed, applying the principles of biopharmaceutics and pharmacokinetics to the design of controlled release and targeted drug delivery systems. Emphasis is on bioequivalence and bioavailability of traditional pharmaceutical dosage forms and novel drug delivery systems, including the assessment of biosimilars. **(48-0-3)**

PHRP 7020—Experimental Statistics and Informatics

This course provides an overview of the principles of experimental statistics and informatics that are relevant to the experimental design of studies, as well as interpretation and processing of the information garnered from these studies, in the biomedical sciences, but particularly in the area of molecular medicine and pharmacogenomics. **(16-0-1)**

PHRP 7021—Population Health and Public Policy

This highly interactive course introduces students to: (1) the fundamental concepts and frameworks used for the study of population health and public policy; (2) the financing and managing of health systems at the local and international levels; and (3) the formulation and analysis of public health policies. The course will emphasize the intersection of public health and the determinant of drug use and pharmacy-related policies. Students will analyze and critically evaluate existing health policies, public health actions, and reforms. Students are expected to contribute and participate in the discussion of current research, case studies, and policies. Student learning will be assessed through oral exams, written assignments, presentations, and an analytical paper. This course will provide skills for the conceptualization of research projects addressing current health issues related to pharmacy. **(48-0-3)**

PHRP 7023—Pharmaceutical Marketing

This course is intended to provide the graduate student with an in-depth understanding of the global development and marketing of pharmaceuticals with an emphasis on the U.S. system. **(48-0-3)**

PHRP 7025—Pharmacy Management and Finance

This course provides an overview of management theories, human resources, and financial management applied to pharmacy and health care institution operations. Elements of supervision, management, and leadership are discussed in an effort to help students develop the skills needed to operate a pharmacy effectively. Also covered are finance topics such as capital costs, profit analysis, cost structures, budgeting, payment for services rendered, and accounting. **(48-0-3)**

PHRP 7030—Biostatistics

This course introduces methods for presenting data in summary form, analyzing data, and designing experiments. It emphasizes the application of statistical ideas and methods to the analysis and interpretation of experiments and comparative data. Students will be able to assess a situation involving data analysis, state the null and alternative hypotheses proposed, decide on the correct statistical procedure to test the null hypothesis and the assumptions of the test used, calculate the statistic, assess its statistical significance, and interpret the data in light of the calculated results. **(48-0-3)**

PHRP 7060—Pharmaceutical Sciences Research Design

The purpose of this course is to provide an analysis of the study designs most commonly employed in experimental research, with emphasis in basic and clinical pharmacological research. Completion of the course is expected to enable students to understand the considerations that go into selecting qualitative, quantitative, and mixed methods of research design. The course prepares students to select the most appropriate design to better answer a specific research question, as well as to understand the strengths and limitations of such design. **(16-0-1)**

PHRP 7110—Bioethical Principles of Life Science Research

This course will provide an understanding of the ethical issues associated with life science research, acculturate students to the mores of the life science research community, discuss issues related to the use of animals and human subjects in research, develop skills for communicating life science research to diverse audiences, and help students develop the skills needed to be successful life science researchers. **(48-0-3)**

PHRP 7114—Molecular and Cellular Pharmacodynamics

This course is a study of the considerations in operating and regulating cellular processes by manipulating receptors for therapeutic advantage through coupled signaling pathways. Recent developments in this technique as it applies to the treatment of disease will be presented. **(48-0-3)**

PHRP 7120—Research Design

This course provides an overview of research design. It covers understanding the preliminary considerations that go into selecting a research design. These include considering philosophical world views; reviewing the literature;

understanding the use of theory; sampling; measurement; pre-experimental, correlational, or experimental design; data collection; and data analysis strategies. Discussions on the process of research as it relates to each approach will also be reviewed. This process includes writing an introduction, specifying a purpose statement, developing research questions and/or hypotheses, and proposing methods of data collection and analysis plans. **(48-0-3)**

PHRP 7203—Social Measurement and Techniques

This course introduces students to the concepts of advanced measurement theory and methods used in research. It acquaints students with cutting-edge models in measurement theory and methods, as well as with the application of computer software used to implement those methodologies. After completing the course, students should be prepared to begin working on advanced applications of measurement in the sociobehavioral sciences. **(48-0-3)**

PHRP 7204—Research Techniques and Instrumentation

This course will augment the student's rotation experiences with a broader view of state-of-the-art technologies and instruments used in pharmaceutical sciences research. It will allow the student to read the literature with greater understanding as methodological terminology begins to have more meaning. It is meant to be a broad survey of technologies, not provide a deep background in any specific technology. **(48-0-3)**

PHRP 7209—Pharmacoeconomics

This course provides an overview of pharmacoeconomics and some of the health outcome measurements that apply to health/pharmacy-related disciplines. The course is designed to focus on methodological principles of pharmacoeconomics analyses and the strengths and weaknesses of specific methods. Practical examples for successful implementation of these concepts are discussed. **(48-0-3)**

PHRP 7211—Theories of Health-Seeking Behavior

This course covers social and behavioral theories related to medication use, health services utilization, provider patient communication, and other health-seeking behaviors. Students will examine and apply select health behavior theories at the individual, interpersonal, and community level. They will examine research conducted using the theories, with emphasis in the pharmacy field. Students are expected to apply theories in defining research questions, in research design, and in data analysis. **(48-0-3)**

PHRP 7220—Advanced Pharmacogenomics and Molecular Medicine

This course is designed to educate students with an in-depth knowledge and understanding of the cellular and molecular bases that have evolved as the basis of human diseases. The course offers the contemporary molecular biological

concepts to apply toward understanding molecular bases of individual variation, its application to drug response, and possible new interventions. Students will be able to understand and apply the knowledge of modern molecular biological techniques for diagnostics and detection of infection; gene defects; fingerprinting, transgenesis, biopharming, and immunotherapies; and the ever-developing field of gene therapy and regenerative medicine. **(48-0-3)**

PHRP 7221—Advanced Graduate Research

This research course is design to provide guidance to students through the complete research process, from formulation of a topic to data collection and analysis to completion of a final report. Students are encouraged to present research findings at appropriate professional conferences. **(80-0-5)**

PHRP 7222—Applied Pharmacology

Students will use pharmacological principles to study the effects of therapeutic agents on the central nervous system, the endocrine system, the gastrointestinal system, blood, and blood-forming organs. The course will address the rationale for the use of therapeutic agents; their effects on cells, tissues, organ systems, and patients; the mechanisms underlying these effects; the therapeutic value of specific drug effects; the limitation of the use of the agents; and the adverse effects of drugs. **(48-0-3)**

PHRP 7226—Journal Club

This course provides graduate students with an opportunity to critically read, interpret, and present research literature. The audience will be fellow peers, postdoctoral students, and faculty members. Students will prepare and present high-quality written and oral critiques of peer-reviewed publications in the biomedical field. This course will help students stay abreast of current knowledge in their, as well as their colleagues, fields of research; develop presentation skills; and promote interdisciplinary interactions. **(16-0-1)**

PHRP 7229—Product Development and Industrial Pharmacy

This course provides students with the essential information about the various stages of the new drug approval process and drug development, including preformulation, comparison studies, suitability of pharmaceutical excipients, and formulation. Additionally, this course provides students with the principles of pharmaceutical processing, such as filtration, milling, mixing, drying, and compression of pharmaceutical solids. It also deals with the production and quality control of tablets, capsules, liquid dosage forms, semi-solid dosage forms, and sterile products. Coverage includes the science of packaging materials, production management, quality assurance, and regulations in the pharmaceutical industry, including validation, good manufacturing practice, and FDA guidelines for stability of pharmaceutical dosage forms. **(64-0-4)**

PHRP 7243—Research Design II

This course aims to enable students to develop an understanding of the philosophical foundations of, and the practical issues arising from, adopting qualitative or open-ended inquiry and mixed-methods approach, with a particular emphasis on pharmacy and health-related implementation research. It will also cover philosophical foundations, theory, and methodological topics, including sampling, generalization, and validity related to qualitative and mixed-methods research. Students will learn how to formulate a qualitative research question; collect, manage, and analyze qualitative data; and write qualitative findings. **(48-0-3)**

PHRP 7320—Advanced Biostatistics I

This course is the first of a two-course sequence focusing on inferential statistics for students interested in conducting quantitative research in the health sciences. It enables students to gather data and apply experimental design models toward solving practical problems and improving the efficiency of formulating and providing health care services. **(48-0-3)**

PHRP 7330—Advanced Biostatistics II

This course is the second of a two-course sequence focusing on inferential statistics for students interested in conducting quantitative research in the health sciences. It enables students to gather data and apply experimental design models toward solving practical problems and improving the efficiency of formulating and providing health care services. **(48-0-3)**

PHRP 7610—Scientific Writing

This course will give students the opportunity to attain and practice scientific writing skills in a low-stress environment. The course focuses on writing for scientific publication and includes every step of the process from organization of the first draft to the editorial review process. Students will work using material from their own discipline, preferably from original data they have or intend to collect. Students will be writing a section of manuscript each week and will receive editorial suggestions and criticisms from a variety of reviewers. Students are expected to be proficient in English grammar, vocabulary, and spelling prior to taking this course. Students who are deficient in the mechanics of writing may wish to pursue an elective course to enhance their proficiency. **(16-0-1)**

PHRP 7620—Research Funding and Proposal Development

This course provides an overview of the major components and the practical skills needed for writing a research proposal for funding purposes. It will include an exploration of the different funding sources in the biomedical field. Students will be introduced to the terminology associated with grant writing and learn to differentiate among the categories of funders. They will be provided with multiple hands-on experiences and exercises related to completing an application. **(16-0-1)**

PHRP 8000/8100/8200—Dissertation Research

This course consists of independent, full-time research on an approved dissertation problem mentored by a major adviser. The research effort will continue until the problem is solved or resolved to the satisfaction of the mentor and the student's dissertation committee. Certification for graduation requires an oral defense of the written dissertation resulting from this research endeavor. **(128-0-8)**

PHRP 8250—Advanced Topics in Pharmaceutical Sciences

This course offers a survey of cutting-edge techniques and discoveries that are germane to the pharmaceutical sciences, particularly in the area of pharmaceuticals. **(16-32-[1-2])**

PHRP 8301—Graduate Research

This course introduces students to the fundamental tenets of pharmaceutical sciences research at the graduate level. This course is required each semester until students become degree candidates. Students will work on a one-on-one basis with their faculty mentor to become familiar with the research interests, literature, and laboratory techniques of the mentor. **(48-0-3)**

PHRP 8400—Graduate Seminar

The purpose of this course is to equip students with the necessary tools so that they can prepare and present lucid reports on their own research, as well as the research of others. The course will consist of weekly lectures that will be required of all graduate students throughout their course of study and research. Speakers will include faculty members and guests, as well as students presenting aspects of their research. **(16-0-1)**

PHRP 8900—Dissertation Defense

This course serves as the concluding evaluation for all Ph.D. students. It consists of an oral defense of the dissertation that is written to present the significance, methods, and findings of the dissertation research project. The defense, which is open to the public, requires the student to demonstrate a firm grasp of the research area and to defend the dissertation and the associated research before the Dissertation Committee. After successful defense, the student becomes eligible for conferral of the Ph.D. degree. **(128-0-8)**

PHRE (Elective) Courses**PHRE 7035—Pharmaceutical Patents and Litigations**

This course is intended to teach students the basics of patent laws, patent structure, patent literatures, patenting process/evaluation, and patent invalidity/infringement/litigations. It is focused only on pharmaceutical patents, and the students are expected to learn the basics by reviewing and practicing real case patenting and litigation studies. Since novelty and innovation are integral tasks of a pharmaceutical formulation scientist, this course would help graduates to successfully patent and prosecute their novel research. **(48-0-3)**

PHRE 7071—Essentials of Project Management for Pharmacy I

This course serves as an introduction to project management terminology, knowledge, concepts, and skills used in the current work environment. It lays the foundation of project management methods and best practices. Topics covered guide the student on the use of project management tools and techniques to successfully initiate, plan, execute, monitor, and close a project. Students learn about planning, scheduling, organizing, and implementing projects and explore current practices in project management from a pharmacy perspective. **(48-0-3)**

PHRE 7081—Essentials of Project Management for Pharmacy II

This course will prepare students for the project management work environment through a deeper understanding of leadership and team dynamics. In addition, the course introduces negotiation techniques, ethical principles and practices, and professional standards in the workplace. Topics covered guide the student on Lean Six Sigma (LSS) tools and techniques to achieve operational excellence and improve business process efficiency in the work environment. Students will have the opportunity to learn Lean Six Sigma fundamentals, tools, and concepts toward achieving a Yellow Belt certificate administered by LinkedIn Learning. The material introduced in the course is presented from a pharmacy perspective. **(48-0-3)**

PHRE 7091—Pharmaceutical Project Management

This course provides the student with the knowledge of the basic tools necessary for managing projects in the pharmaceutical industry. Students will learn about needs, time, and resources that are essential in the pharmaceutical industry. The course covers the full spectrum of project management's role and responsibility in the pharmaceutical industry, from manufacturing and supply management through product recall management. Students will learn how to anticipate problems and opportunities and how to find resolutions to achieve successful projects. **(48-0-3)**

PHRE 7107—Current Topics in Pharmaceutical Sciences

This course covers special topics selected by faculty members and visiting scientists. The goal of each topic is to provide students with an understanding of, and an appreciation for, current problems and procedures underlying the pharmaceutical sciences discipline. **(48-0-3)**

PHRE 7205—Advanced Quantitative Methods

This course exposes students to selected advanced empirical methods useful in social, behavioral, economic, and administrative research and provides them with hands-on experience in conducting empirical research. Within this context, the course covers a variety of topics, including linear programming, network models, utility and game theory, panel data methods, instrumental variables methods, and propensity

score matching approaches. The course will be presented in an application context. Examples from social, behavioral, economic, and administrative studies will be used to illustrate key ideas and methods. **(48-0-3)**

PHRE 7207—Secondary Data Analysis of Pharmacy-Related Sources

This course gives students the opportunity to apply the skills learned in the research design and biostatistics courses by completing a secondary data analysis research project using a federal database. Students will write a basic research protocol and become familiar with the basic structure and methodology of the United States National Health and Nutrition Examination Survey (NHANES) database. Students will prepare a dataset, conduct descriptive and basic statistical analyses using SPSS, write an abstract, and deliver a presentation to a small audience. **(48-0-3)**

PHRE 7208—Advanced Pharmacokinetics

This course will explain the model development techniques that can be utilized for complex pharmacodynamic systems. Advanced data analysis techniques and modern pharmacokinetic theory will be discussed. **(48-0-3)**

PHRE 7210—Modern Medicine

This course aims to integrate various multidisciplinary domains of science and technology to address the development and translation of advanced multifunctional pharmaceuticals for targeted therapy of specific organs/tissues/cells in hard-to-treat diseases. The course describes different types of smart, multifunctional drug delivery systems (DDSs) and drug delivery devices (DDD) using various advanced nanobiomaterials. The course elaborates on the applications of nanoscale multimodal DDSs/DDDs in targeted therapy of detrimental diseases, such as solid tumors. It outlines cell-/tissue-specific targeted therapy and provides overviews on the applications of theranostics for simultaneous diagnosis and therapy. **(48-0-3)**

PHRE 7213—Epidemiology of Drug Use, Abuse, and Misuse

This course is designed to introduce doctoral students to the epidemiology of drug use, misuse, and abuse. The course focuses on drug use, misuse, and abuse as social phenomena and deals with the history of drug use and regulatory attempts in America; pharmacology and use patterns related to specific drugs; use, abuse, and misuse as medical, psychological, and social concepts; drug importation, manufacture, and distribution (including both the legal and illegal drug industries); perspectives on the etiology of drug use/abuse; drug abuse prevention and educational programs; and approaches to drug abuse treatment. **(48-0-3)**

PHRE 7216—Pharmaceutical Polymers

This course presents basic concepts and properties of polymers as related to formulation, development, and design of pharmaceutical dosage forms and products. It describes how basic principles

of polymers—structural, physical, chemical, and mechanical properties—can be utilized in modifying and developing current and novel pharmaceutical products. Moreover, the course highlights important areas of polymer applications in controlled drug delivery, targeted drug delivery, tissue engineering, nanotechnology, and medical devices. **(48-0-3)**

PHRE 7223—Drugs of Abuse

This course covers types of substances abused, methods and routes of administration, the pertinent toxicokinetics, the pharmacological/toxicological mechanisms, and the clinical manifestations of drug abuse. The anatomical and neurochemical substrates of drugs of abuse are also described. Treatment of intoxication and withdrawal, societal impact of drug abuse, legal implications, and current trends of substance abuse are addressed as well. **(48-0-3)**

PHRE 7252—Fundamentals of Pharmacognosy

This course exposes graduate students to the field of pharmacognosy, with an emphasis on medicinal products derived from plants and other natural sources. The major classes of medicinally active natural products, their origin (nomenclature + taxonomy), structure, biosynthesis, and mode of action will be covered. The naturally derived constituents and their therapeutic efficacy will be discussed. Students will be required to develop a monograph for a bioactive plant or marine species, including a comprehensive summary of the peer-reviewed research available regarding its pharmacological profile. **(48-0-3)**

PHRE 7350—Contemporary Issues in Pharmacy

This course is designed to explore a broad spectrum of contemporary issues related to pharmacy practice, pharmaceutical industry, third-party payment, and health policy. It aims to increase student awareness and understanding of the change in pharmacy practices and their impacts to the U.S. health care system. **(48-0-3)**

PHRE 7431—Oncologic Treatments and Pharmacogenomics

This course introduces the basic molecular concepts of cancer and pharmacogenomics in the context of cancer treatment. It presents the current methodologies used in cutting-edge oncology for the treatment of two of the most common types of cancer: breast and colon. The standard-of-care combinatorial regimens will be presented, as well as the treatment scenarios that are applied to advanced-stage and recurrent disease. Drugs that have increased patient tolerance to these genotoxic regimens will also be discussed. Finally, the application of next-generation sequencing of tumor DNA or RNA to determine which of the more than 300 druggable mutations exist in these tumors will be discussed, primarily in the cancer-recurrence setting. Prognostic tests based on RNA expression from tumors will be covered. Discussion of the rationale for insurance coverage of pharmacogenomic variability will be covered as well. The impact of oncologic pharmacogenomics on future clinical trials will also be examined. **(48-0-3)**

PHRE 7447—Regulatory Affairs

This course provides an exposure to the important and critical area of drug regulatory matters. It describes the role of federal laws, regulations, and the structure and operation of the U.S. Food and Drug Administration. It also compares similar agencies in other countries. **(48-0-3)**

PHRE 7515—Health Disparities and Chronic Diseases: The Role of the Pharmacist

This course presents the main causes and pathways to health disparities in the United States. It focuses on chronic diseases, such as diabetes, cancer, and cardiovascular diseases. Emphasis is given to disparities associated with access to medication and pharmacy services and to adherence. Students learn about pharmacy-led interventions aimed at reducing health disparities. They are expected to use epidemiological data to study the disparities and to formulate recommendations to the pharmacy field. Students are assessed through hands-on, structured assignments. **(48-0-3)**

PHRE 7993—Literature Research in Pharmaceutical Sciences

The course involves the directed reading, evaluation, and analysis of scientific literature (papers and reviews) in the fields of pharmacology, pharmaceuticals, biopharmaceutics, pharmacokinetics, drug delivery systems, pharmaceutical technology, biotechnology, and toxicology, among others. It involves, thorough reading and assimilation of scientific information, preparing reports and/or manuscripts, as agreed between the adviser and advisee. Through mutual agreement between the faculty member and the student, a specific area of research within a field will be selected. Under the direct supervision of a faculty member, students will be

- trained on the retrieval of scientific information
- mentored to understand the findings of the paper(s)
- taught to build hypotheses of their own on the leading topics from various publications and reviews
- trained in writing papers and reviews

(0-144-3)

Student Activities

Student Government Association (SGA)

The Student Government Association (SGA) is the official voice of all students. The organization is open to all students and welcomes proposals and participation from the entire student body. Its responsibilities include collecting and expressing student opinion, dispensing funds for student activities, acting as liaison for the student body, promoting pharmacy, supporting organization and class activities, and working to improve the quality of life for students at the College of Pharmacy.

The list that follows includes the College of Pharmacy-approved student organizations and task force.

- Academy of Managed Care Pharmacy (AMCP)
- Alpha Zeta Omega (AZO)
- American Association of Psychiatric Pharmacists (AAPP)
- American Pharmacists Association—Academy of Student Pharmacists (APhA-ASP)
- American Society of Consultant Pharmacists (ASCP)
- Christian Pharmacists Fellowship International (CPFI)
- Class Officers Executive Boards
- Industry Pharmacists Organization (IPhO)
- International Pharmaceutical Students' Association (IPSA)
- International Society for Pharmacoeconomics and Outcomes Research (ISPOR)
- Jewish Pharmacy Student Organization (JPSO)
- Kappa Psi (KΨ)
- Legislative Task Force
- National Community Pharmacists Association (NCPA)
- Phi Delta Chi (ΦΔΘ)
- Phi Lambda Sigma (ΦΛΣ)
- Rho Chi (Px)
- Student College of Clinical Pharmacy (SCCP)
- Student National Pharmaceutical Association (SNPhA)
- Student Society of Health-System Pharmacists (SSHP)

College of Pharmacy Faculty

PHARMACEUTICAL SCIENCES

Chair and Professor: **B. Albeni** | Professors: **J. Barar, A. M. Castejon, M. A. Clark, L. Cubeddu, R. Deth, P. Gannett, Y. Omid, H. Omidian, A. Rathinavelu, R. Speth** | Associate Professors: **R. Ansari, T. Ghafourian, Y. Kwon, J. Latimer, A. Lympelopoulos, D. Minond** | Assistant Professors: **N. Gurusamy, J. Gutiérrez-Rocca, E. Nieves** | Clinical Assistant Professors: **J. Czerwinska, D. Gazze** | Instructors/Academic Facilitators: **M. O'Malley, J. Varela** | Instructor/Research Associates: **S. Dixon, M. Sabbir**

SOCIOBEHAVIORAL AND ADMINISTRATIVE PHARMACY

Chair and Professor: **S. E. Rabionet** | Professor Emeritus: **M. J. Carvajal** | Professor: **P. W. Sullivan** | Associate Professors: **G. Alvarez, N. Khanfar, M. Nusair, I. Popovici, A. Perez Rivera, J. Sánchez** | Assistant Professors: **G. Armayor, G. Silva-Suarez** | Instructors: **D. DaCosta, R. Nappi**

PHARMACY PRACTICE

Interim Chair and Professor: **J. A. Rey** | Associate Professors: **T. Benny, K. Fiano, C. A. Luque, R. McGory, M. J. Seamon, E. Sherman, D. Singh-Franco, W. Wolowich** | Assistant Professors: **Y. Alvarado, K. Ayala Rivera, K. Berger, D. Elia, E. Frenzel Shepherd, G. Hale, D. Holger, A. Levin, J. Marin, M. Metzner, B. Ortiz, M. Santibañez, G. Silva-Suarez, J. Steinberg, M. Tailor** | Clinical Assistant Professors: **M. Brook, E. Byrne, R. Colón, F. Colón-Pratts, T. Gangoo-Dookan, B. Hierholzer, L. Lafferty, S. Michaels, M. Pansuria, D. Pino, G. P. Ramos-Otero, J. Riskin, J. Rodriguez, N. Simkin-Zeltsman, E. Zwachte** | Instructors/Academic Facilitators: **O. Elharar, M. Lopez, B. Patel Dharmani, N. Thelemaque**