The UNC Eshelman School of Pharmacy offers graduate programs leading to the master of science in pharmaceutical sciences with a specialization in health-system pharmacy administration and to the doctor of philosophy in pharmaceutical sciences with concentrations in one of four research areas: chemical biology and medicinal chemistry; pharmacoengineering and molecular pharmaceutics; pharmacotherapy and experimental therapeutics; or pharmaceutical outcomes and policy. Students from the master of science in pharmaceutical sciences with a specialization in health-system pharmacy administration are competitive for careers in administrative positions in hospital pharmacies and other health systems. Students in from the Ph.D. program are competitive for careers in academia, pharmaceutical companies, biotech companies, government agencies such as the FDA, CDC, and NIH, nonprofit research organizations, and a variety of alternative careers including patent law, venture capital, and entrepreneurialism.

Instruction emphasizes contemporary research methods, study design, and results and is delivered in the form of small group lectures/discussions, group activities and recitations, and seminars combined with intensive laboratory-based research. The excellent rapport that exists between schools, departments, institutes, and centers within the University facilitates interdisciplinary collaborative research by graduate students and faculty. The graduate degree programs also benefit from faculty affiliations with GlaxoSmithKline, Inc., the Research Triangle Institute, the Hamner Institutes for Health Sciences, Duke University, the Wake Forest University School of Medicine, and many other organizations in the Research Triangle Park area. The UNC Eshelman School of Pharmacy is housed in Beard Hall, Kerr Hall, Marsico Hall, and the Genetic Medicine Building, which are located on the health sciences campus together with the Adams Schools of Dentistry, the School of Medicine, the School of Nursing and the Gillings School of Global Public Health. The Health Sciences Library has an outstanding collection of books and journals as well as computer and support services. Library and laboratory resources residing in other University departments are also available for use by students and faculty.

Admission to the Ph.D. Program

Applicants who have completed a standard collegiate curriculum in pharmacy, chemistry, biochemistry, biology, engineering, or in an allied field in the University, or in other universities or colleges having curricula acceptable to UNC—Chapel Hill's Graduate School, are eligible for admission to the graduate program in pharmaceutical sciences. Applicants must submit Graduate Record Examination scores, letters of recommendation, official transcripts, and a statement of personal goals as they relate to graduate study at the UNC Eshelman School of Pharmacy. The Graduate School online application (http://gradschool.unc.edu/admissions/) is the standard means of applying for admission. Inquiries concerning admission to programs in the pharmaceutical sciences may be directed to the Office of Curricular and Student Affairs, CB# 7566, 109 Beard Hall, Chapel Hill, NC 27599-7566.

All applications to the UNC Eshelman School of Pharmacy's Ph.D. in pharmaceutical sciences program must be submitted through the UNC Graduate School.

Deadlines

Review of applications begins December 1 and we strongly recommend that applications are completed prior to that deadline. Although you can apply until February 13, completing your application before December 1 will maximize your chances of acceptance and nomination for UNC Graduate School fellowships.

Application Requirements

- Graduate School application
- Nonrefundable $87.50 application fee
- Three current letters of recommendation: When filing out the Graduate School application, applicants will be asked to submit the e-mail addresses of the recommenders, who will then receive an e-mail with information for logging into the system to submit their letters.
- Transcripts
- GRE test scores that are no more than five years old
- Statement of purpose (see below)
- A current e-mail address (the Graduate School only uses e-mail to communicate with applicants)

Notes

- For Question 2 on the application, make sure you scroll down the list until you see “School of Pharmacy.” In the dropdown menu for School of Pharmacy, please select Pharmaceutical Sciences.
- Applicants must indicate only one choice on their application for their division of interest or specialization. Only the first choice of division (i.e., area of interest or specialization) will be considered on their application. Applicants should also describe this choice in their statement of purpose.
- Being admitted to The Graduate School does not imply that you will receive financial assistance of any kind. The awarding of financial assistance is a separate decision.

Questions

Consult the Graduate School's application instructions (http://gradschool.unc.edu/admissions/instructions.html) or contact gradinfo@unc.edu.

Statement of Purpose

To assist in the evaluation of your application, please provide a concise personal statement including the following information:

- Why do you wish to pursue graduate study in pharmaceutical sciences?
- Why do you wish to engage in graduate study in this institution?
- What are your reasons for selecting your first choice of division (i.e., area of interest or specialization)?
- What do you offer that will enrich our graduate program? Please include factors such as:
  - Work, teaching, or other life experiences
  - Meaningful events that have influenced your life and career choices
  - Communication abilities
Application Procedures

• Problem-solving skills
• Are you a leader, follower, or team player?
• History of overcoming challenges or disadvantages
• Cultural diversity (this may include ethnic background, race, and other attributes that define your cultural background)
• If possible, please identify the specific research areas in which you plan to focus your graduate studies. Is there a particular faculty member with whom you would like to work?

Admission to the M.S. Program

Applicants to the master’s program must meet both of the following requirements:

1. Be a licensed pharmacist in the U.S.
2. Hold a Doctor of Pharmacy (Pharm.D.) or the equivalent

Everything detailed below must be completed prior to the deadline for your application to be considered.

Interested applicants will need to apply to the University of North Carolina Graduate School for their didactic component. The applicant will also need to complete separate applications for each residency program to which they wish to apply — UNC Hospitals, Duke University Health System, Wake Forest Baptist Hospital, Mission Health in Asheville, or Moses Cone in Greensboro. Applicants need only to apply to their residency programs of interest.

Individual interview days will be scheduled at times convenient for applicants and institutions. Each applicant and program will communicate to identify the ideal time to conduct the interview. Our hope is to have all of the interviews for an applicant in one consecutive period.

Each program will participate in the match, but each one has a different match number. If you have not done so already, please make sure to register for the National Matching Service offered through ASHP. Currently there are four positions available at UNC, one at Duke, two at Wake Forest, one at Mission Health and one at Moses Cone for a total of nine per cohort.

Application Procedures

• Complete a Graduate School application for admission (see link below)
• Create an online account
• Fill out the application information as follows:
  • Level of Study: Graduate
  • Type of Applicant: New degree-seeking applicant
  • Major: Pharmaceutical Sciences
  • Degree: Master of Science
  • Area of Interest or Specialization: Practice Advancement and Clinical Education
  • Select the term of entry
  • Fill out the applicant information
  • Fill out educational background
  • Upload your unofficial transcripts — undergraduate and graduate
  • Upload a statement of purpose
  • GREs are waived for applicants with a Pharm.D. degree and a GPA greater than 3.0
  • Upload a copy of your CV/resume
• Submit the application and pay the non-refundable $85 application fee
• Provide three letters of recommendation (may be identical to those provided for the residency program application) using the recommendations link on the online application under “Important Links”
• Have your graduate and undergraduate school submit an official academic transcript for each school attended. The graduate school will request official transcripts after acceptance into the program only.

* Please note: The GRE waiver applies to applicants possessing a Pharm.D. with a GPA greater than 3.0. Qualified applicants may submit an online application without entering this standardized test score. Although your application status may show “incomplete,” this status will not be held against you at the time of review, and the waiver will be honored if you are offered admission to our M.S. program.

Graduate Assistantships and Fellowships in the UNC Eshelman School of Pharmacy

Research assistantships in the UNC Eshelman School of Pharmacy provide a competitive stipend, health insurance, tuition, and fees for 12 months’ service. All awards are made on a competitive basis with consideration given to the applicant’s academic record and research experience. Information concerning these assistantships, fellowships, and traineeships may be obtained by writing directly to the Office of Research and Graduate Education at the UNC Eshelman School of Pharmacy.

Chemical Biology and Medicinal Chemistry

Chemical biology and medicinal chemistry are multidisciplinary fields that integrate organic chemistry, biochemistry, molecular biology, structural biology, pharmacology, and physiology. The research in the division applies and extends the basic concepts of chemistry, biochemistry, and pharmacology to the investigation of biomedical problems. General areas of study include structure-activity relationships, drug-receptor interactions, synthetic drug design, and target discovery and validation. Specific focus areas include cancer chemotherapy, computer-aided drug design, enzymology, glycomics, molecular modeling, natural products, neurochemistry, parasitology, and structural biology.

Pharmacoengineering and Molecular Pharmaceutics

Pharmacoengineering and molecular pharmaceutics represents interdisciplinary specialties encompassing a range of scientific endeavors, including the design, fabrication, evaluation, use of, and delivery strategies for dosage forms; elucidation of the behavior of pharmacologic agents in biologic systems; determination of the ability of pharmacologic agents to reach the relevant site of biologic effect; and determination of the time course of biologic activity.

These areas of specialization represent critical steps in the development of new therapeutic agents, the evaluation of new and existing drugs, and the optimal clinical use of pharmacologic agents.

Students in the Division of Pharmacoengineering and Molecular Pharmaceutics are required to participate in a common core of entry-level graduate courses. This core provides a broad perspective of the pharmaceutical sciences as well as an appreciation for how different
Pharmaceutical Outcomes and Policy

The Division of Pharmaceutical Outcomes and Policy offers a Ph.D. program in pharmaceutical sciences emphasizing an interdisciplinary approach to addressing issues relevant to medication use at the patient, provider, community, and societal levels. Faculty research interests and course offerings reflect this interdisciplinary orientation. Students develop knowledge and skills that enable them to conduct high quality research directed at improving the use and cost effectiveness of medications, technology, and services. Education and research in the division draws heavily upon expertise in numerous fields such as health services research, health policy, health communication, health behavior and behavior change, epidemiology, and psychometrics. Areas of faculty and student research include communication and decision making, comparative effectiveness of medications and pharmacy practice models, medication adherence and self-management, health disparities, health literacy, patient outcomes assessment, pharmaceutical policy analysis, and policy and ethical issues related to pharmacogenomics.

Pharmacotherapy and Experimental Therapeutics

The Division of Pharmacotherapy and Experimental Therapeutics offers a Ph.D. program in the pharmaceutical sciences with a focus on translational research that integrates biomedical and pharmaceutical sciences in both laboratory-based models and in humans. The goal of the program is to develop scientists who are prepared to generate and disseminate new knowledge in pharmacotherapy and accelerate its application to improve patient care. Graduate students engage in clinical experiences throughout the program that are designed to complement each student’s research interests while also facilitating their development as translational scientists. Areas of graduate coursework and research include drug metabolism and transport, pharmacokinetics/pharmacodynamics/pharmacometrics, pharmacogenomics, clinical research, drug development, experimental therapeutics, and mechanisms of drug toxicity. Therapeutic and research areas of particular strength include cardiovascular disease, infectious disease/HIV, oncology/hematology, hepatology/gastroenterology/transplant, and pulmonary disease.

Master of Science in Pharmaceutical Sciences

The Eshelman School of Pharmacy offers a master of science in pharmaceutical sciences with a specialization in health-systems pharmacy.

The M.S. program prepares future health care leaders to manage highly complex and multifaceted pharmacy enterprise operations. To accomplish this goal, the program provides students with the knowledge, skills, and experience necessary to assume a variety of roles and responsibilities. Graduates serve as vibrant, committed professionals with a focus on improving patients’ health, health care delivery, and the profession of pharmacy. This occurs through both didactic education and experiential opportunities in class and in the workplace.

The residential M.S. program is designed for full-time students with a Pharm.D. degree who are seeking residency training experience.

The fully online M.S. program is designed for working professionals with a pharmacy degree who want to secure their degree while working.

Distinguished Professors

Jeffrey Aube, Center for Integrative Chemical Biology and Drug Discovery (CICBDD)
Kim Brouwer, Pharmacotherapy and Experimental Therapeutics
Stefanie Ferreri, Practice Advancement
Stephen Frye, Center for Integrative Chemical Biology and Drug Discovery (CICBDD)
Leaf Huang, Pharmacoengineering and Molecular Pharmaceutics
Michael Jay, Pharmacoengineering and Molecular Pharmaceutics
Alexander Kabanov, Center for Nanotechnology in Drug Discovery (CNDD)
David Lawrence, Chemical Biology and Medicinal Chemistry
Kuo-Hsiung Lee, Chemical Biology and Medicinal Chemistry
Jian Liu, Chemical Biology and Medicinal Chemistry
Denise Rhoney-Metzger, Practice Advancement
Betsy Sleath, Pharmaceutical Outcomes and Policy
Alexander Tropsha, Chemical Biology and Medicinal Chemistry

Professor of the Practice

John Bamforth, Eshelman Institute for Innovation
Jon Easter, Practice Advancement
Anthony Hickey, UNC Catalyst for Rare Disease
Stephanie Kiser, Practice Advancement

Professors

Kristy Ainslie, Pharmacoengineering and Molecular Pharmaceutics
Jennifer Elston-Lafata, Pharmaceutical Outcomes and Policy
Timothy Ives, Practice Advancement
Andrew Lee, Chemical Biology and Medicinal Chemistry
Mary McClurg, Practice Advancement
James H. Patterson, Pharmacotherapy and Experimental Therapeutics
Paul Watkins, Pharmacotherapy and Experimental Therapeutics

Associate Professors

Albert Bowers, Chemical Biology and Medicinal Chemistry
Delesha Carpenter, Pharmaceutical Outcomes and Policy
Gang Fang, Pharmaceutical Outcomes and Policy
Daniel Gonzalez, Pharmacotherapy and Experimental Therapeutics
Nathaniel Hathaway, Chemical Biology and Medicinal Chemistry
Erin Heinzen Cox, Pharmacotherapy and Experimental Therapeutics
Shawn Hingtgen, Pharmacoengineering and Molecular Pharmaceutics
Federico Innocenti, Pharmacotherapy and Experimental Therapeutics
Michael Jarstfer, Chemical Biology and Medicinal Chemistry
Samuel Lai, Pharmacoengineering and Molecular Pharmaceutics
Craig Lee, Pharmacotherapy and Experimental Therapeutics
Rihe Liu, Chemical Biology and Medicinal Chemistry
Jacqueline McLaughlin, Practice Advancement
Juliane Nguyen, Pharmacoengineering and Molecular Pharmaceutics
Sachiko Ozawa, Practice Advancement
Robert Shrewsbury, Practice Advancement
Scott Singleton, Chemical Biology and Medicinal Chemistry
Philip Smith, Pharmacoengineering and Molecular Pharmaceutics
Kathleen Thomas, Pharmaceutical Outcomes and Policy
Carolyn Thorpe, Pharmaceutical Outcomes and Policy
Joshua Thorpe, Pharmaceutical Outcomes and Policy
Dennis Williams, Pharmacotherapy and Experimental Therapeutics
Timothy Wiltsire, Pharmacotherapy and Experimental Therapeutics
William Zamboni, Pharmacotherapy and Experimental Therapeutics
Qisheng Zhang, Chemical Biology and Medicinal Chemistry

Assistant Professors
Aaron Anselmo, Pharmacoengineering and Molecular Pharmaceutics
Yanguang Cao, Pharmacoengineering and Experimental Therapeutics
Daniel Crona, Pharmacochemistry and Experimental Therapeutics
Julie Dumond, Pharmacoengineering and Experimental Therapeutics
Klarissa Jackson, Pharmacoengineering and Experimental Therapeutics
Lindsey James, Chemical Biology and Medicinal Chemistry
Alan Kinlaw, Pharmaceutical Outcomes and Policy
Robert McGinty, Chemical Biology and Medicinal Chemistry
Gauri Rao, Pharmacochemistry and Experimental Therapeutics
Megan Roberts, Pharmaceutical Outcomes and Policy
Amada Seyerle, Pharmaceutical Outcomes and Policy
Casey Tak, Pharmaceutical Outcomes and Policy

Research Professors
Dmitri Kireev, Center for Integrative Chemical Biology and Drug Discovery (CICBDD)
Susan Morris-Natschke, Chemical Biology and Medicinal Chemistry
Kenneth Pearce Jr., Center for Integrative Chemical Biology and Drug Discovery (CICBDD)
Xiaodong Wang, Center for Integrative Chemical Biology and Drug Discovery (CICBDD)
Timothy Willson, Structural Genomics Consortium

Research Associate Professors
Eric Bachelder, Pharmacoengineering and Molecular Pharmaceutics
Elena Batrakova, Center for Nanotechnology in Drug Discovery (CNDD)
David Drewry, Structural Genomics Consortium
Robert Hubal, Practice Advancement
Juan Li, Pharmacoengineering and Molecular Pharmaceutics
Ievgen Muratov, Chemical Biology and Medicinal Chemistry
Samantha Pattenden, Center for Integrative Chemical Biology and Drug Discovery (CICBDD)
Elias Rosen, Pharmacochemistry and Experimental Therapeutics
Marina Sokolsky-Papkov, Pharmacoengineering and Molecular Pharmaceutics
Yongmei Xu, Chemical Biology and Medicinal Chemistry

Research Assistant Professors
Katelyn Arnold, Chemical Biology and Medicinal Chemistry
Alison Axtman, Structural Genomics Consortium
Jacqueline Bezencon, Pharmacochemistry and Experimental Therapeutics
Carrie Blanchard, Center for Medication Optimization (CMO)
Rachel Church, Pharmacochemistry and Experimental Therapeutics
Mackenzie Cottrell, Pharmacochemistry and Experimental Therapeutics
Anita Crescenzi, Practice Advancement
Scott Davis, Pharmaceutical Outcomes and Policy
Yury Desyaterik, Pharmacochemistry and Experimental Therapeutics
Kevin Frankowski, Center for Integrative Chemical Biology and Drug Discovery (CICBDD)
Dong Fu, Pharmacochemistry and Experimental Therapeutics
Masuo Goto, Chemical Biology and Medicinal Chemistry
Lauren Haar, Chemical Biology and Medicinal Chemistry
Jine Li, Chemical Biology and Medicinal Chemistry
Melanie Livet, Center for Medication Optimization (CMO)
Matthew Loop, Pharmacotherapy and Experimental Therapeutics
Andrew Lucas, Pharmacotherapy and Experimental Therapeutics
Merrie Mosedale, Pharmacotherapy and Experimental Therapeutics
Jillian Perry, Center for Nanotechnology in Drug Discovery (CNDD)
Paul Sapienza, Chemical Biology and Medicinal Chemistry
Junjiang Sun, Pharmacoengineering and Molecular Pharmaceutics
Benjamin Urick, Center for Medication Optimization (CMO)
Qunzhuo Wang, Chemical Biology and Medicinal Chemistry
Bin Xiao, Pharmacoengineering and Molecular Pharmaceutics

Clinical Professors
Robert Dupuis, Pharmacotherapy and Experimental Therapeutics
Adam Persky, Pharmacotherapy and Experimental Therapeutics
Jo Ellen Rodgers, Pharmacotherapy and Experimental Therapeutics
John Greene Shepherd, Practice Advancement

Clinical Associate Professors
Amanda H. Corbett, Pharmacotherapy and Experimental Therapeutics
Wendy Cox, Practice Advancement
Stephen Eckel, Practice Advancement
Macary Marciniak, Practice Advancement
Nicole Pinelli Reitter, Practice Advancement
Philip Rodgers, Practice Advancement
Mollie Scott, Practice Advancement
Deborah Sturpe, Pharmacochemistry and Experimental Therapeutics

Clinical Assistant Professors
Heidi Anksorus, Practice Advancement
Amber Frick, Pharmacotherapy and Experimental Therapeutics
Kathryn Fuller, Practice Advancement
Jessica Greene, Pharmacoengineering and Molecular Pharmaceutics
Suzanne Harris, Practice Advancement
Kathryn Morbitzer, Practice Advancement
Benym Muluneh, Pharmacochemistry and Experimental Therapeutics
Kimberly Sanders, Practice Advancement
Amanda Savage, Practice Advancement
David Steeb, Practice Advancement
Carla White, Practice Advancement
Charlene Williams, Practice Advancement
Jacqueline Zeeman, Practice Advancement

Subjects in this school include: Chemical Biology and Medicinal Chemistry (CBMC) (p.), Pharmacoengineering and Molecular Pharmaceutics (DPMP) (p.), Pharmacotherapy and Experimental Therapeutics (DPET) (p.), Practice Advancement and Clinical Education (PACE) (p.), Pharmaceutical Outcomes and Policy (DPOP) (p.), and Pharmaceutical Sciences (PHRS) (p.).

Note that the courses listed below are not listed in the order and number of times that they must be completed. See the program's Web site for more detailed information about the sequence of courses and credit hour totals. The program's Web site also provides information about concentrations.

Chemical Biology and Medicinal Chemistry

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CBMC 807</td>
<td>Foundations of Chemical Biology I: Organic and Medicinal Chemistry</td>
<td>3</td>
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**Pharmacoengineering and Molecular Pharmaceutics**

<table>
<thead>
<tr>
<th>Code</th>
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<th>Hours</th>
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<tbody>
<tr>
<td>PHRS 801</td>
<td>Foundations for Cross-Disciplinary Training in the Pharmaceutical Sciences</td>
<td>1-3</td>
</tr>
<tr>
<td>DPMP 738</td>
<td>Nanomedicine</td>
<td>3</td>
</tr>
<tr>
<td>DPMP 862</td>
<td>Advanced Physical Pharmacy</td>
<td>1.5</td>
</tr>
<tr>
<td>DPMP 863</td>
<td>Advanced Pharmaceutics II</td>
<td>1.5</td>
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<tr>
<td>DPMP 864</td>
<td>Advances in Drug Delivery</td>
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<tr>
<td>DPET 853</td>
<td>PK Module 1: Pharmacokinetic Concepts and Applications</td>
<td>1.75</td>
</tr>
<tr>
<td>DPMP 815</td>
<td>Drug Metabolism</td>
<td>1.5</td>
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<tr>
<td>PHRS 899</td>
<td>Seminar in Pharmaceutical Sciences</td>
<td>1</td>
</tr>
<tr>
<td>PHRS 991</td>
<td>Research in Pharmaceutical Sciences</td>
<td>1-9</td>
</tr>
<tr>
<td>PHRS 994</td>
<td>Doctoral Research and Dissertation</td>
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**Pharmacotherapy and Experimental Therapeutics**

**Clinician Track**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>DPET 873</td>
<td>Precision Therapeutics Through Genomics</td>
<td>3</td>
</tr>
<tr>
<td>DPET 833</td>
<td>Experimental Design Considerations in Clinical Research</td>
<td>2</td>
</tr>
<tr>
<td>DPET 854</td>
<td>PK Module 1: Pharmacokinetic Concepts and Applications</td>
<td>1.75</td>
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<tr>
<td>DPET 857</td>
<td>PK Module 3: Population PK/PD Analysis</td>
<td>2</td>
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<tr>
<td>DPET 858</td>
<td>PK Module 4: Advanced PK/PD Modeling</td>
<td>2</td>
</tr>
<tr>
<td>DPET 841</td>
<td>Science and Methods in Drug Development</td>
<td>2</td>
</tr>
<tr>
<td>PHRS 801</td>
<td>Foundations for Cross-Disciplinary Training in the Pharmaceutical Sciences</td>
<td>1-3</td>
</tr>
<tr>
<td>PHRS 899</td>
<td>Seminar in Pharmaceutical Sciences</td>
<td>1</td>
</tr>
<tr>
<td>PHRS 991</td>
<td>Research in Pharmaceutical Sciences</td>
<td>1-9</td>
</tr>
<tr>
<td>PHRS 994</td>
<td>Doctoral Research and Dissertation</td>
<td>3</td>
</tr>
<tr>
<td>DPMP 815</td>
<td>Drug Metabolism</td>
<td>1.5</td>
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</table>

Approved elective courses (6)

**Non-Clinician Track**

<table>
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<tr>
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<th>Hours</th>
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<tbody>
<tr>
<td>DPET 833</td>
<td>Experimental Design Considerations in Clinical Research</td>
<td>2</td>
</tr>
<tr>
<td>DPET 853</td>
<td>PK Module 1: Pharmacokinetic Concepts and Applications</td>
<td>1.75</td>
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<tr>
<td>DPET 854</td>
<td>PK: Module 2: Pharmacodynamic Concepts and Applications</td>
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<tr>
<td>DPET 873</td>
<td>Precision Therapeutics Through Genomics</td>
<td>3</td>
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<tr>
<td>DPET 841</td>
<td>Science and Methods in Drug Development</td>
<td>2</td>
</tr>
<tr>
<td>DPET 856</td>
<td>Advanced Pharmacokinetics and Pharmacodynamics</td>
<td>4</td>
</tr>
<tr>
<td>DPET 857</td>
<td>PK Module 3: Population PK/PD Analysis</td>
<td>2</td>
</tr>
<tr>
<td>DPMP 815</td>
<td>Drug Metabolism</td>
<td>1.5</td>
</tr>
<tr>
<td>PHRS 899</td>
<td>Seminar in Pharmaceutical Sciences</td>
<td>1</td>
</tr>
<tr>
<td>PHRS 991</td>
<td>Research in Pharmaceutical Sciences</td>
<td>1-9</td>
</tr>
<tr>
<td>PHRS 994</td>
<td>Doctoral Research and Dissertation</td>
<td>3</td>
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</table>

**Pharmaceutical Outcomes and Policy**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>DPOP 803</td>
<td>Social and Behavioral Aspects of Pharmaceutical Use</td>
<td>3</td>
</tr>
<tr>
<td>DPOP 806</td>
<td>Pharmaceutical Policy</td>
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</tr>
<tr>
<td>DPOP 872</td>
<td>Proposal Writing in DPOP</td>
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<tr>
<td>DPOP 870</td>
<td>Pharmaceutical Outcomes Research</td>
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</tr>
<tr>
<td>EPID 710</td>
<td>Fundamentals of Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>EPID 705</td>
<td>Introduction to Deductive and Probability Logic in Epidemiology</td>
<td>2</td>
</tr>
<tr>
<td>EPID 715</td>
<td>Theory and Quantitative Methods in Epidemiology</td>
<td>4</td>
</tr>
<tr>
<td>EPID 716</td>
<td>Epidemiologic Data Analysis</td>
<td>3</td>
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<tr>
<td>EPID 765</td>
<td>Methods and Issues in Pharmacoepidemiology</td>
<td>3</td>
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<tr>
<td>PHRS 815</td>
<td>Foundations in Implementation Science: Examples in Precision Health and Society</td>
<td>1.5</td>
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<tr>
<td>PHRS 899</td>
<td>Seminar in Pharmaceutical Sciences</td>
<td>1</td>
</tr>
<tr>
<td>PHRS 991</td>
<td>Research in Pharmaceutical Sciences</td>
<td>1-9</td>
</tr>
<tr>
<td>PHRS 994</td>
<td>Doctoral Research and Dissertation</td>
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**Practice Advancement and Clinical Education (Master's Program)**

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>PACE 815</td>
<td>Evaluation Research and Project Design</td>
<td>3</td>
</tr>
<tr>
<td>PACE 820</td>
<td>Health-System Pharmacy Leadership</td>
<td>3</td>
</tr>
<tr>
<td>PACE 825</td>
<td>Foundational Practices of a Successful Health-System Department of Pharmacy</td>
<td>4</td>
</tr>
<tr>
<td>PACE 832</td>
<td>Financial Management of Health-system Pharmacy</td>
<td>3</td>
</tr>
<tr>
<td>PACE 833</td>
<td>Overview of Health Systems</td>
<td>3</td>
</tr>
<tr>
<td>PACE 860</td>
<td>Advanced Hospital Pharmacy Operations</td>
<td>3</td>
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<tr>
<td>PHRS 899</td>
<td>Seminar in Pharmaceutical Sciences</td>
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<td>PHRS 991</td>
<td>Research in Pharmaceutical Sciences</td>
<td>1-9</td>
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<tr>
<td>PHRS 992</td>
<td>Master’s (Non-Thesis)</td>
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