Twin Cities Campus

Experimental and Clinical Pharmacology Ph.D.

Experimental and Clinical Pharmacology

College of Pharmacy

Link to a list of faculty for this program.

Contact Information:
Department of Experimental and Clinical Pharmacology, University of Minnesota College of Pharmacy, 7-115 Weaver-Densford Hall, 308 Harvard Street S.E., Minneapolis, MN 55455 (612-625-2160)
Email: grad-ecp@umn.edu
Website: https://z.umn.edu/ecpgrad

- Program Type: Doctorate
- Requirements for this program are current for Fall 2020
- Length of program in credits: 48
- This program does not require summer semesters for timely completion.
- Degree: Doctor of Philosophy

Along with the program-specific requirements listed below, please read the General Information section of the catalog website for requirements that apply to all major fields.

The Experimental and Clinical Pharmacology (ECP) graduate program was designed specifically for students interested in clinical research. Its goal is to advance the science of human pharmacology and therapeutics to improve the safe, effective, and economical use of drugs by patients.

Students study such topics as experimental pharmacotherapy, drug metabolism, infectious disease, neuroscience/neuropharmacology, pharmacometrics, and pharmacogenomics. Graduates are prepared for distinguished careers in clinical research.

Program Delivery

This program is available:

- via classroom (the majority of instruction is face-to-face)

Prerequisites for Admission

The preferred undergraduate GPA for admittance to the program is 3.00.

A US bachelor's degree or a comparable foreign degree from a recognized college or university is required.

Preference is given to candidates who have had a professionally-related pharmacy education, but those from other fields such as biology, chemistry, statistics, and public health will be considered.

Other requirements to be completed before admission:
All international students who are non-English speakers are required to submit TOEFL scores. TOEFL test date must be within 2 years of program start. However, applicants who have completed 24 quarter credits or 16 semester credits within the past 24 months in residence as full-time students at recognized institutions of higher learning in the United States or other English-speaking countries before entering the University of Minnesota are generally exempted from this requirement. GRE required by all students except for applicants that have completed a PharmD at a U.S.-accredited institution.

Special Application Requirements:
Students are generally admitted to the ECP program for fall semester only. All application materials should be submitted by the admissions deadline listed on the departmental website. Applications received after the application deadline will be considered on a space-available basis only.

Application to the ECP program at the University of Minnesota is done entirely online.

International applicants must submit score(s) from one of the following tests:

- TOEFL
  - Internet Based - Total Score: 79
  - Internet Based - Writing Score: 21
  - Internet Based - Reading Score: 19

The preferred English language test is Test of English as Foreign Language

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Key to test abbreviations(TOEFL).

For an online application or for more information about graduate education admissions, see the General Information section of the catalog website.

Program Requirements

24 credits are required in the major.
24 thesis credits are required.

This program may be completed with a minor.

Use of 4xxx courses toward program requirements is permitted under certain conditions with adviser approval.

A minimum GPA of 3.00 is required for students to remain in good standing.

At least 2 semesters must be completed before filing a Degree Program Form.

Required Courses (9 credits)

Take the following courses. Take ECP 8982 twice for a total of 2 credits, and take ECP 8100 2 times for a total of 2 credits.
ECP 5220 - Regulatory Issues in Drug Research (2.0 cr)
ECP 8230 - Principles of Clinical Pharmacology (2.0 cr)
ECP 8983 - Scientific Communications in Experimental and Clinical Pharmacology (1.0 cr)
ECP 8982 - Inter-Institutional Journal Club in Translational Research (1.0 cr)
ECP 8100 - Seminar (1.0 cr)

Statistical Analysis (4 credits)

Select at least one of the following courses in consultation with the advisor. Two courses are preferred and will count towards Electives or Focus Area.
PUBH 6450 - Biostatistics I (4.0 cr)
or STAT 5101 - Theory of Statistics I (4.0 cr)
or PUBH 6451 - Biostatistics II (4.0 cr)
or STAT 5102 - Theory of Statistics II (4.0 cr)

Electives

Take additional courses, in consultation with the director of graduate studies and/or advisor to complete the 24 course credits required.
ANAT 5xxx
or ANAT 6xxx
or ANAT 7xxx
or ANSC 5xxx
or ANSC 8xxx
or BBE 5xxx
or BBE 8xxx
or BICB 5xxx
or BICB 8xxx
or BINF 5xxx
or BIOC 5xxx
or BIOC 6xxx
or BIOC 8xxx
or BIOL 5xxx
or BIOL 6xxx
or BIOL 8xxx
or BMEN 5xxx
or BMEN 8xxx
or BMSC 8xxx
or BTHX 5xxx
or BTHX 8xxx
or CGSC 8xxx
or CHEM 5xxx
or CHEM 8xxx
or CLS 5xxx
or CLS 8xxx
or CMB 5xxx
or CMB 8xxx

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or ECHO 4xxx
or ECP 5xxx
or ECP 8xxx
or EEB 5xxx
or EEB 8xxx
or GCD 5xxx
or GCD 6xxx
or GCD 8xxx
or HINF 5xxx
or HINF 8xxx
or MATH 5xxx
or MATH 8xxx
or MCDG 8xxx
or MEDC 5xxx
or MEDC 8xxx
or MICA 8xxx
or NSC 5xxx
or NSC 8xxx
or NSCI 5xxx
or NSCI 6xxx
or NURS 5xxx
or NURS 6xxx
or NURS 7xxx
or NURS 8xxx
or PHAR 5xxx
or PHAR 6xxx
or PHAR 7xxx
or PHCL 5xxx
or PHCL 8xxx
or PHM 5xxx
or PHM 6xxx
or PHM 8xxx
or PHSL 5xxx
or PHSL 6xxx
or PHSL 8xxx
or PUBH 5xxx
or PUBH 6xxx
or PUBH 7xxx
or PUBH 8xxx
or SAPH 5xxx
or SAPH 8xxx
or SCB 5xxx
or SCB 8xxx
or SCIC 8xxx
or STAT 5xxx
or STAT 8xxx
or TXCL 5xxx
or TXCL 8xxx
or VMED 5xxx
or VMED 8xxx

Thesis Credits

Take exactly 24 credit(s) from the following:
•ECP 8888 - Thesis Credit: Doctoral (1.0 - 24.0 cr)

Focus Areas

Pharmacometrics (11 credits)

Coursework chosen from the following list, or other courses to meet the 11-credit focus area requirement, are selected in consultation with the advisor.
ECP 8500 - Advances in Pharmacometrics Modeling and Simulation (1.0 cr)
or ECP 8501 - Pharmacometrics (2.0 cr)
or ECP 8502 - Introductory Population Pharmacokinetic Methods (2.0 cr)
or ECP 8503 - Intermediate Population PK/PD Methods (2.0 cr)
or ECP 8504 - Modeling Biologics (2.0 cr)
or ECP 8505 - Application of physiological-based pharmacokinetic modeling(PBPK) to model-informed drug development (2.0 cr)

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or ECP 8506 - Clinical Trial Simulation (2.0 cr)
or PUBH 6450 - Biostatistics I (4.0 cr)
or PUBH 6451 - Biostatistics II (4.0 cr)
or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
or PUBH 7430 - Statistical Methods for Correlated Data (3.0 cr)
or PUBH 7440 - Introduction to Bayesian Analysis (3.0 cr)
or PUBH 7450 - Survival Analysis (3.0 cr)
or STAT 5101 - Theory of Statistics I (4.0 cr)
or STAT 5102 - Theory of Statistics II (4.0 cr)

-OR-

Neuroscience/Neuropharmacology (11 credits)
Coursework chosen from the following list, or other courses to meet the 11-credit focus area requirement, are selected in consultation with the advisor.
NSC 5461 - Cellular and Molecular Neuroscience (3.0 cr)
or NSCI 5501 - Neurodegenerative Diseases, Mechanisms to Therapies (3.0 cr)
or PUBH 6450 - Biostatistics I (4.0 cr)
or PUBH 6451 - Biostatistics II (4.0 cr)
or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)
or **Neuro-Immune Interactions**
CMB 8361 - Neuro-Immune Interactions (3.0 cr)
or NSC 8026 - Neuro-Immune Interactions (3.0 cr)
or PHCL 8026 - Neuro-Immune Interactions (3.0 cr)
or **Advanced Neuropharmaceutics**
CMB 8481 - Advanced Neuropharmaceutics (4.0 cr)
or NSC 8481 - Advanced Neuropharmaceutics (4.0 cr)
or PHM 8481 - Advanced Neuropharmaceutics (4.0 cr)

-OR-

Infectious Diseases (11 credits)
Coursework chosen from the following list, or other courses to meet the 11-credit focus area requirement, are selected in consultation with the advisor.
ECP 5620 - Drug Metabolism and Disposition (3.0 cr)
or MICA 8002 - Structure, Function, and Genetics of Bacteria and Viruses (4.0 cr)
or MICA 8003 - Immunity and Immunopathology (4.0 cr)
or MICA 8010 - Microbial Pathogenesis (3.0 cr)
or PHAR 6224 - Advanced Pharmacogenomics and Precision Medicine (2.0 cr)
or PUBH 6450 - Biostatistics I (4.0 cr)
or PUBH 6451 - Biostatistics II (4.0 cr)
or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

-OR-

Pharmacogenomics (11 credits)
Coursework chosen from the following list, or other courses to meet the 11-credit focus area requirement, are selected in consultation with the advisor.
ECP 5620 - Drug Metabolism and Disposition (3.0 cr)
or ECP 8900 - Advanced Topics in Experimental and Clinical Pharmacology (1.0 - 4.0 cr)
or GCD 4034 - Molecular Genetics and Genomics (3.0 cr)
or GCD 4143 - Human Genetics and Genomics (3.0 cr)
or GCD 8073 - Genetics & Genomics in Human Health (2.0 cr)
or PHAR 6224 - Advanced Pharmacogenomics and Precision Medicine (2.0 cr)
or PUBH 6381 - Genetics in Public Health in the Age of Precision Medicine (2.0 cr)
or PUBH 6450 - Biostatistics I (4.0 cr)
or PUBH 6451 - Biostatistics II (4.0 cr)
or PUBH 7420 - Clinical Trials: Design, Implementation, and Analysis (3.0 cr)

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