

# Medicinal Chemistry

## Mailing Address:

Department of Medicinal Chemistry and Pharmacognosy (MC 781)  
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## Contact Information:

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## Administration:

Head of the Department: Judy Bolton  
Director of Graduate Studies: Douglas D. Thomas

## Program Codes:

20FS1454MS (MS)  
20FS1454PHD (PhD)

The Department of Medicinal Chemistry and Pharmacognosy offers work leading to degrees in Medicinal Chemistry at both the master's and doctoral levels. Medicinal chemistry is focused on the discovery and development of biologically active agents with potential therapeutic application. The program is focused on the following areas - Analytical and Chemical Toxicology, Biomedical Chemistry, Computational Medicinal Chemistry, Structural Biology, and Synthetic Medicinal Chemistry. Medicinal chemistry also participates in a Joint PharmD/PhD (<http://catalog.uic.edu/gcat/colleges-schools/pharmacy/pharmd-phd>) program. The department also offers a graduate program in Pharmacognosy (<http://catalog.uic.edu/gcat/colleges-schools/pharmacy/pmpg>).

## Admission and Degree Requirements

- MS in Medicinal Chemistry (<http://catalog.uic.edu/gcat/colleges-schools/pharmacy/mdch/ms>)
- PhD in Medicinal Chemistry (<http://catalog.uic.edu/gcat/colleges-schools/pharmacy/mdch/phd>)

### MDCH 412. Pharmaceutical Applications of Genomics and Bioinformatics. 2 hours.

Introduction to genomics and bioinformatics for advanced pharmacy students. Principles of gene expression, DNA sequencing in bacterial and human genomes, with emphasis on diagnostic and therapeutic applications. Course Information: Same as PMMP 412. Prerequisite(s): PHAR 331 or consent of the instructor. For graduate students: one or two semesters of basic molecular biology and/or biochemistry with a grade of B or better.

### MDCH 461. Introductory Organic Medicinal Chemistry. 1 hour.

Covers introductory aspects of graduate organic and physical organic chemistry related to medicinal chemistry. Course Information: Credit is not given for MDCH 461 if the student has credit in MDCH 560. Prerequisite(s): One year of undergraduate organic chemistry and consent of the instructor.

### MDCH 507. Drug Discovery, Design and Development. 3 hours.

Overview of drug development process from target identification and screening through clinical trials and FDA evaluation. Course Information: Same as BPS 507 and PMPG 507.

### MDCH 516. Structure Elucidation of Natural Products II. 3 hours.

Employing modern computational methods in the structure elucidation and dereplication of a natural product by using real life examples. Course Information: Same as PMPG 516. May be repeated. Class Schedule Information: To be properly registered, students must enroll in one Lecture and one Lecture-Discussion.

### MDCH 553. Cancer Biology and Therapeutics. 2 hours.

Fundamentals of cancer biology with emphasis on biological, hormonal and chemotherapeutic drug therapies currently used and in development. Specific treatment approaches to breast, ovarian, prostate and colon cancers will be explored. Course Information: Same as BPS 553 and PMPG 553. Prerequisite(s): Consent of the instructor. Recommended background: Molecular and Cellular Biology.

### MDCH 560. Organic Medicinal Chemistry I. 3 hours.

Organic reactions are discussed in terms of their mechanisms and utility in the field of medicinal chemistry, particularly in the synthesis of medicinal agents. Course Information: Prerequisite(s): One year of organic chemistry with laboratory.

### MDCH 561. Principles of Medicinal Chemistry. 4 hours.

Concerns basic chemical and physical principles necessary for an understanding of drug action. These principles are applied in the design and discovery of medicinal agents. Course Information: Prerequisite(s): One year each of undergraduate organic chemistry and biochemistry. Requires concurrent registration in MDCH 592.

### MDCH 562. Spectroscopy in Medicinal Chemistry. 3 hours.

The fundamental principles used to determine structure and conformation in molecules, emphasizing spectroscopic methods useful in solving structural problems and in analyzing dynamic biological processes. Course Information: Prerequisite(s): One year of physical chemistry or consent of the instructor.

### MDCH 564. Physical Medicinal Chemistry. 3 hours.

Focuses on kinetics and thermodynamics in biological systems. Applications to drug action will be emphasized. Course Information: Prerequisite(s): One year of physical chemistry.

### MDCH 571. Organic Medicinal Chemistry II. 3 hours.

Heterocyclic chemistry foundation for bio-organic mechanisms of enzyme reactions. Enzymes involved in biosynthesis and metabolism, particularly those that are targets for drug action or involved in drug metabolism. Course Information: Prerequisite(s): MDCH 460 and MDCH 561.

### MDCH 572. Drug Design. 2 hours.

Quantitative structure-activity relationships, computer graphics, molecular modeling and simulation, and chemometrics as applied to drug design and discovery. Course Information: Prerequisite(s): MDCH 561.

### MDCH 573. Principles of Stereochemistry. 1 hour.

Principles of molecular structure and stereochemistry for medicinal and natural products chemists focusing on stereochemical structures rather than synthesis. Course Information: Prerequisite(s): Credit or concurrent registration in MDCH 560 and one year of organic chemistry with lab or consent of the instructor.

### MDCH 585. Practical Liquid Chromatography-Mass Spectrometry. 2 hours.

Introductory-level course combining classroom discussions with laboratory demonstrations to provide basic practical knowledge and hands-on experience in the operation of liquid chromatography and mass spectrometry instrumentation. Course Information: Satisfactory/Unsatisfactory grading only. Prerequisite(s): MDCH 562.

**MDCH 592. Research Techniques in Medicinal Chemistry. 2 hours.**

Provides an initial biweekly informal seminar series with program faculty presenting a discussion of the ongoing research in her/his laboratory. Course Information: May be repeated to a maximum of 6 hours. Lectures/discussions will be given for the first part of the semester and an intensive lab experience takes place for the remainder of the semester. To be taken fall and spring semesters of the first year of graduate study.

**MDCH 593. Graduate Student Seminar Class. 1 hour.**

Provides practice and practical guidance for giving a high quality research seminar. Course Information: Satisfactory/Unsatisfactory grading only.

**MDCH 594. Special Topics in Medicinal Chemistry. 2-4 hours.**

An advanced course covering selected topics which may include new spectroscopic, theoretical, chemometric and synthetic approaches to biomolecular structure and function. Course Information: May be repeated to a maximum of 4 hours. Prerequisite(s): MDCH 561 and MDCH 562 and one year of physical chemistry and one semester of biochemistry or consent of the instructor.

**MDCH 595. Seminar in Medicinal Chemistry. 1 hour.**

Presentation on a current research topic. Course Information: Satisfactory/Unsatisfactory grading only.

**MDCH 598. Master's Research in Medicinal Chemistry. 0-16 hours.**

Thesis research to fulfill master's degree requirements. Course Information: Satisfactory/Unsatisfactory grading only.

**MDCH 599. Doctoral Research in Medicinal Chemistry. 0-16 hours.**

Research for doctoral students. Course Information: Satisfactory/Unsatisfactory grading only.