MEDICINAL CHEMISTRY (MEDC)

MEDC 310. Medicinal Chemistry and Drug Design. 3 Hours.  
Semester course; 3 lecture hours. 3 credits. Prerequisite: CHEM 302.  
This course is designed to expose undergraduate chemistry, biology  
and pre-medicine majors to the history, theory and practice of medicinal  
chemistry. The course will emphasize a combination of fundamentals  
and applications of drug design. In particular, the molecular aspects  
of drug action will be discussed. Special emphasis will also be placed on  
the methods used by medicinal chemists to design new drugs. Crosslisted  
as: CHEM 310.

MEDC 526. Research Techniques in Medicinal Chemistry. 1-4 Hours.  
Semester course; 0-2 lecture and 2-8 laboratory hours. 1-4 credits.  
The theory and application of classical, instrumental, and computer  
techniques used in medicinal chemistry research are presented.

MEDC 527. Basic Pharmaceutical Principles for the Practicing  
Pharmacist. 3 Hours.  
Semester course; 3 lecture hours. 3 credits. Examines basic science  
principles in organic chemistry and biological chemistry as specifically  
related to the pharmaceutical treatment of disease.

MEDC 530. Bioinformatics and Genomics in Drug Research. 3 Hours.  
Semester course; 3 lecture hours. 3 credits. Covers the basic elements  
of cellular pathways and drug interactions, and how modern genomics  
comes into play. Presents bioinformatics principles being used every day  
in data-intensive fields of research. Introductory and concept-oriented,  
the course will prepare students for grasping how bioinformatics is being  
used in many areas of biomedical sciences. Geared toward students  
coming from a variety of backgrounds in biology, biochemistry and  
chemistry. While many of the analytical approaches are statistical  
in nature, there is no requirement for a background in statistics or  
mathematics. Each student will have the opportunity to design a small  
project applying bioinformatics concepts. Crosslisted as: BNFO 530.

MEDC 532. Medicinal Chemistry for Nurse Anesthetists. 3 Hours.  
Semester course; 3 lecture hours. 3 credits. A review of the principles  
of organic chemistry and bio-organic chemistry presented as a series of  
lectures covering the structure-activity relationships, metabolism, and  
mechanism of action of selected agents.

MEDC 533. Pharmacognosy. 2 Hours.  
Semester course; 2 lecture hours. 2 credits. Designed to introduce  
the basic concepts of pharmacognosy that apply to crude drugs and  
semipurified and purified natural products that are typically available  
in pharmacies. The regulation of herbal products and evaluation of the  
purity and bioavailability of alternative and complementary medicines will  
be discussed.

MEDC 541. Survey of Molecular Modeling Methods. 1 Hour.  
Semester course; lecture and laboratory hour. 1 credit. Introduces  
computational chemistry and molecular graphics with the current  
software used for drug design and small molecule/large molecule  
interactions. Computational chemistry problems will be emphasized in  
the laboratory.

MEDC 542. Biotechnology-derived Therapeutic Agents. 1 Hour.  
Semester course; 1 lecture hour. 1 credit. Provides the fundamentals  
of biotechnology-derived biological agents including structure, manufacture,  
stability, analysis, formulation and usage. Selected examples of biological  
agents in current and future therapy may also be covered.

MEDC 543. Clinical Chemistry for the Pharmacist. 1 Hour.  
Semester course; 1 lecture hour. 1 credit. A study of the underlying  
principles and practical limitations of analytical procedures with  
emphasis on evaluation of over-the-counter analytical products currently  
sold or used in pharmacies and assays of organ pathophysiology used in  
hospitals.

MEDC 553. Concepts in the Medicinal Chemistry of Therapeutics Agents.  
1 Hour.  
Semester course; 1 lecture hour. 1 credit. Introduces topics in medicinal  
chemistry common to all drug classes, including structure activity  
relationships, principles of drug action, drug design and drug metabolism.  
Drugs acting on the autonomic nervous system are presented as a case  
study illustrating applications of the general principles.

MEDC 555. Fundamentals of Drug Discovery I. 3.5 Hours.  
Semester course; 3.5 lecture hours. 3.5 credits. Students will work  
individually or in groups to learn the fundamentals of medicinal chemistry  
and drug discovery. The course utilizes formal lectures, informal  
group discussions, literature research and formal oral and/or written  
assignments to impart knowledge and practice of drug discovery. The  
course focus will be on molecular biology and pharmacological aspects  
of medicinal chemistry.

MEDC 556. Fundamentals of Drug Discovery II. 3.5 Hours.  
Semester course; 3.5 lecture hours. 3.5 credits. Students will work  
individually or in groups to learn the fundamentals of medicinal chemistry  
and drug discovery. The course utilizes formal lectures, informal  
group discussions, literature research and formal oral and/or written  
assignment to impart knowledge and practice of drug discovery. The  
course focus will be on methodologies and techniques of medicinal  
chemistry.

MEDC 591. Special Topics in Medicinal Chemistry. 3.5 Hours.  
Semester course; 1-3.5 credits. An elective course in which students may  
choose to participate in individual or group study in one or more areas  
of medicinal chemistry. The course can take the form of formal lectures,  
informal group discussions, literature research, and/or laboratory  
research. Students must have the permission of the individual instructor  
before registering for this course.

MEDC 601. Advanced Medicinal Chemistry I. 2 Hours.  
Semester course; 2 lecture hours. 2 credits. This course is designed  
to expose graduate students to the history and practice of medicinal  
chemistry with an emphasis on drug development, design, structure-  
activity relationship studies and their association with diseases to  
prepare students for future work in academia or industry.

Hours.  
Semester course; 3 lecture hours. 3 credits. Prerequisite: permission of  
instructor. A study of chemical transformations in organic chemistry, their  
mechanisms and their application to the synthesis of complex target  
molecules.

MEDC 610. Advanced Medicinal Chemistry II. 2 Hours.  
Semester course; 2 lecture hours. 2 credits. Prerequisite: MEDC 601 or  
permission of instructor. Introduces concepts for understanding the  
medicinal chemistry of the central nervous system.
MEDC 614. Research Techniques. 1-4 Hours.
Semester course; variable hours. Variable credit. Credit will be given on the basis of 1 credit per 45 hours of laboratory time. Prerequisite: approval of research adviser. Provides new graduate student with the laboratory skills necessary to perform research in the chosen discipline. The training time required will depend upon the discipline. Graded as pass/fail. Crosslisted as: PCEU 614/PHAR 614.

MEDC 620. Advanced Medicinal Chemistry III. 2 Hours.
Semester course; 2 lecture hours. 2 credits. Prerequisite: MEDC 601 or the permission of the instructor. Reviews the concepts necessary for enzyme inhibitor design. Emphasizes the design of new agents to treat disease states by enzyme inhibition.

MEDC 630. Theoretical Methods in Drug Design. 2 Hours.
Semester course; lecture and laboratory hours. 2 credits. Prerequisites: MEDC 601, MEDC 610 or MEDC 620, or permission of instructor. A study of the theoretical methods of drug structure-activity analysis, including molecular orbital theory, topological indexes and physical property correlations. Computational chemistry problems will be emphasized in the laboratory.

MEDC 642. Nucleoside, Nucleotide, Carbohydrate and Peptide Chemistry. 3 Hours.
Semester course: 1 lecture hour. 1 credit. Surveys nucleoside, nucleotide, carbohydrate and peptide chemistry with emphasis on their synthesis.

MEDC 643. Regioselective Drug Metabolism. 1 Hour.
Semester course; 1 lecture hour. 1 credit. Surveys drug biotransformation reactions. Emphasizes the molecular aspects of Phase I and Phase II drug metabolism.

MEDC 644. Asymmetric Synthesis. 1 Hour.
Semester course; 1 lecture hour. 1 credit. Reviews the major asymmetric chemical transformations, including mechanisms, scope and synthetic utility.

MEDC 645. Introduction to Heterocyclic Chemistry. 3 Hours.
Semester course; 1 lecture hour. 1 credit. Introduces the chemistry of heterocyclic compounds. Emphasizes heterocyclic nomenclature and the reactions/reactivity of heterocyclic systems.

MEDC 670. Advanced Molecular Modeling Theory and Practice. 3 Hours.
Semester course; 3 lecture/laboratory hours. 3 credits. Prerequisite: MEDC 641 or permission of instructor. Examines the principles and application of computational chemistry and molecular graphics to current problems in drug design. Lectures focus on the application of specific computational methods and techniques to solve problems in drug/molecular design. Workshop sessions provide hands-on experience using state-of-the-art hardware and software for molecular modeling.

MEDC 690. Departmental Research Seminar. 1 Hour.
Semester course; 1 lecture hour. 1 credit. Reports presented by students, staff and visiting lecturers, current problems and developments in pharmaceutical and medicinal chemistry are discussed. Graded as PR in first semester of enrollment, with a letter grade assigned in the following semester.

MEDC 691. Special Topics in Medicinal Chemistry. 1-4 Hours.
Semester course; 1-4 lecture hours. 1-4 credits. Lectures, tutorial studies, and/or library assignments in selected areas of advanced study not available in other courses or as a part of the research training.

MEDC 697. Directed Research in Medicinal Chemistry. 1-15 Hours.
Semester course; 1-15 credits. Research leading to the M.S. or Ph.D. degree.