The Department of Pharmaceutical Sciences offers work leading to degrees in Pharmaceutical Sciences. Course work and research are available in the areas of discovery, development, and formulation of biologically active agents for therapeutic applications. The program is focused on the following areas: Pharmaceutics and Drug Delivery, Pharmacognosy, Chemistry in Drug Discovery, Molecular Mechanisms and Therapeutics, and Forensics.

Note: These graduate degrees are research degrees, not practice degrees. Students who wish to apply to the professional degree program in Pharmacy, see requirements for the UIC Doctor of Pharmacy (PharmD) program.

Admission and Degree Requirements

- MS in Pharmaceutical Sciences (See listing for PhD in Pharmaceutical Sciences)\(^a\)
- PhD in Pharmaceutical Sciences

\(^a\) This department only admits students to the PhD program or gives admission preference to PhD-seeking students.

- Biopharmaceutical Sciences (p. 1)
- Medicinal Chemistry (p. 3)
- Pharmaceutical Sciences (p. 4)
- Pharmacognosy (p. 5)

Biopharmaceutical Sciences

BPS 421. Advanced Dosage Form Design [Compounding]. 1 hour.
Students attend five recitations and ten labs where they make twenty new dosage formulations. Several dosage formulations are of veterinary products used to treat diseases in dogs, cats, horses, cattle and other large animals. Course Information: Prerequisite(s): PHAR 321 and PHAR 322.

BPS 430. Principles of Toxicology. 2 hours.
Examines the toxic effects of drugs and chemicals on organ systems. Lectures emphasize basic principles, effects on specific organ systems, major classes of toxic chemicals, and specialized topics such as forensic and industrial toxicology. Course Information: Same as PCOL 430. Credit is not given for BPS 430 if student has credit for EOHS 457.

BPS 494. Special Topics of Current Interest in Biopharmaceutical Sciences. 1-3 hours.
Courses offered by faculty or a visiting Lecturer on a current topic of selected interest. Topics are available on an experimental basis for one offering only. Course Information: May be repeated to a maximum of 6 hours. Prerequisite(s): Consent of the instructor; good academic standing as defined by UIC policies.

BPS 501. Biopharmaceutical Sciences I. 4 hours.
First part of the fundamental didactic core courses in biopharmaceutical sciences including fundamental principles of pharmaceutics, pharmacokinetics, scientific ethics and research design. Course Information: Prerequisite(s): BPS 501; and graduate standing in the biopharmaceutical sciences program; or approval of the department.

BPS 502. Biopharmaceutical Sciences II. 4 hours.
Second part of fundamental didactic core courses in biopharmaceutical sciences; fundamental principles of cell and molecular biology and pharmacogenomics, pharmacodynamics including toxicology, research communication and regulatory processes. Course Information: Prerequisite(s): BPS 501; and graduate standing in the biopharmaceutical sciences program; or approval of the department.

BPS 506. Industrial Experience. 4-10 hours.
Recommended to graduate students with no industrial experience. Students spend time working in the pharmaceutical, imaging or cosmetic industry under academic supervision to obtain practical experience. Course Information: Satisfactory/Unsatisfactory grading only.

BPS 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 MDCH 507 and PMPG 507.

BPS 508. Concepts in Drug Development: From Bench to Bedside. 3 hours.
Designed to give clinicians an overview of the drug development process from bench to bedside. Emphasis will be placed on the regulatory aspects of drug development including clinical trials, FDA approval and post marketing surveillance. Course Information: Offered online only. Prerequisite(s): Consent of the instructor.

BPS 510. Principles of Interfacial Phenomena. 3 hours.
Quantitative and theoretical principles of physical and chemical sciences as applied to pharmacy. Thermodynamics, kinetics, colloid and surface chemistry in evaluation of pharmaceutical formulations. Course Information: Prerequisite(s): MATH 480.

BPS 515. Dissolution and Bioavailability of Dosage Forms. 2 hours.
Theories and testing of the release of drug from solid dosage forms including the effect of dissolution rate on bioavailability. Course Information: Prerequisite(s): PHAR 323; and approval of the department.

BPS 518. Advanced Drug Delivery Systems. 2 or 3 hours.
Controlled drug delivery systems utilizing polymers, synthesis of different types of devices, and the delivery expected from these devices, and mathematical modeling of delivery systems. Course Information: Same as BIOE 518. Prerequisite(s): Consent of the instructor.
BPS 519. Percutaneous Drug Delivery. 2 hours.
Modern methods of drug delivery covering the use of enhancers, prodrugs, iontophoresis and ultrasound are presented. Toxicity testing, regulatory issues for successful marketing and production issues. Course Information: Prerequisite(s): Consent of the instructor.

BPS 520. Lipid Based Drug Delivery Systems. 2 hours.
The preparation, characterization, stability, pharmaceutical cosmetic and diagnostic applications of lipid based drug delivery systems including liposomes, micelles and emulsions prepared with phospholipids. Course Information: Prerequisite(s): PHAR 323; and approval of the department.

BPS 539. Biopharmaceutical Sciences Research Rotation. 3 hours.
Research rotation course in which first year students from the BPS program will undertake projects in laboratories affiliated with this program. Course Information: May be repeated to a maximum of 9 hours. Animals used in instruction. Prerequisite(s): Consent of the instructor.

BPS 542. Pharmacodynamics of Substance Abuse. 2 hours.
Considers the mechanisms of action, responses, pharmacokinetics and dependence factors of substance abuse. Emphasis will be placed on research strategies in studying the biological aspects of drug abuse. Course Information: Prerequisite(s): Consent of the instructor and a course in basic pharmacology.

BPS 545. Advanced Pharmacokinetics. 3 hours.
Kinetics of absorption, distribution, metabolism and excretion of drugs factors affecting these kinetics and their relationship to pharmacodynamics. Course Information: Prerequisite(s): Consent of the instructor.

BPS 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 MDCH 553 and PMPG 553. Prerequisite(s): Consent of the instructor. Recommended background: Molecular and Cellular Biology.

BPS 555. Principles of Pharmacogenomics. 2 hours.
Concept and application of pharmacogenomics in disease diagnosis, prevention, and treatment. Course Information: Prerequisite(s): BPS 502 or consent of the instructor.

BPS 570. Foundations of Forensic Toxicology. 2 hours.
Survey of forensic toxicology, with emphasis on analytical and interpretive aspects; unique characteristics, underlying philosophies, ethics; analytical methods, nontraditional matrices, interpreting the significance of results. Course Information: Prerequisite(s): Consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BPS 573. Drug Identification Chemistry. 4 hours.
In-depth treatment of classes of commonly encountered drugs of abuse and the analytical methods used in their screening, identification and quantitation. Course Information: Prerequisite(s): Consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BPS 574. Forensic Toxicology. 4 hours.
In-depth treatment of techniques used in forensic toxicology, including specimen preparation, drug or toxin isolation, and analytical methods for screening, identification and quantitation; interpretation, reporting and testifying as to results. Course Information: Prerequisite(s): Consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Lecture and one Laboratory.

BPS 580. Forensic Science: Survey and Foundations. 2 hours.
Survey course for forensic sciences with emphasis on criminalistics; unique characteristics, underlying philosophies; nature, analytical methods, significance of results with chemical, biological, trace, pattern evidence. Course Information: Same as CLJ 580. Prerequisite(s): Approval of the department.

BPS 581. Forensic Analysis of Biological Evidence. 4 hours.
Forensic blood and physiological fluid identification; DNA typing of biological evidence; report writing; expert testimony. Course Information: Prerequisite(s): Consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BPS 582. Forensic Chemistry and Trace Evidence Analysis. 4 hours.
Trace evidence: hairs, fibers, glass, soil, paint and miscellaneous; nature, chemical, instrumental, microscopical methods of analysis; interpretation and significance of trace similaries; expert testimony. Course Information: Prerequisite(s): Consent of the director of graduate studies. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BPS 583. Physical Pattern Evidence Analysis. 4 hours.
Pattern evidence: individualization, reconstruction; fingerprint classification; questioned documents; handwriting comparison; firearms and toolmarks comparisons; scene patterns and reconstruction will be studied indepth. Course Information: Prerequisite(s): Consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BPS 584. Forensic Drug Analysis and Toxicology. 4 hours.
Analysis of commonly abused drugs in their solid-dosage form and in biological media, with emphasis on modern instrumental methods and interpretation of results. Course Information: Prerequisite(s): Consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

BPS 585. Ethical, Quality, Practice, and Legal Issues in Forensic Science. 3 hours.
A topical presentation-discussion of ethical, quality control, admissibility and practice topics emanating from the law-science interface integral to forensic sciences.

BPS 586. Topics in Specialty Forensic Examinations. 1-4 hours.
Topics may vary but will revolve around specialty forensic examinations, covering specific evidentiary classes (e.g. drug identification, DNA typing, fingerprints), including forensic laboratory methods, approaches and data interpretation. Course Information: May be repeated if topics vary. Students may register in more than one section per term. Prerequisite(s): BPS 581 or BPS 582 or BPS 583 or BPS 584; and consent of the instructor. Students must have credit in the forensic science program core course that covers the specific topic.

BPS 587. Forensic Science Seminar. 1 hour.
Weekly seminar series on forensic science research and topics, especially those outside the core requirements. Presentations by students, faculty, and guests. Course Information: Satisfactory/ Unsatisfactory grading only. May be repeated. Prerequisite(s): Graduate or professional standing.

BPS 588. Expert Witness Testimony and Courtroom Demeanor. 3 hours.
Trials, hearings, grand jury; expert versus lay witness; personal and behavioral characteristics on the stand; results, reports and courtroom testimony; simulated trial testimony. Course Information: Prerequisite(s): Approval of the department.
BPS 589. Special Topics in Forensic Science. 3 hours.
Content may vary but will revolve around the philosophic, moral, and managerial problems associated with criminalistics. Topics may include evidence collection, analysis, reporting, and testimony to non-criminalistics fields. Course Information: Same as CLJ 589. May be repeated if topics vary. Prerequisite(s): Consent of the instructor.

BPS 590. Forensic Science Residency. 1-8 hours.
In-depth training for casework analysis in a specific forensic discipline (e.g. drug identification, DNA typing, fingerprints) in an approved forensic science laboratory. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 24 hours. Prerequisite(s): BPS 581 or BPS 582 or BPS 583 or BPS 584; and consent of the instructor. Students must have credit in the forensic science program core course that covers the specific topic.

BPS 591. Topics in Forensic Microscopy. 1-4 hours.
Topic may vary but will revolve around microscopical characterization of various materials, with emphasis on forensic laboratory methods and approaches, and interpretation of materials comparisons as evidence. Course Information: May be repeated if topics vary. Students may register in more than one section per term. Prerequisite(s): BPS 582 and consent of the instructor.

BPS 592. Forensic Science Internship. 2-4 hours.
Placement in a forensic science or toxicology laboratory or setting, under the supervision of a faculty member, with an accepted research project or paper required. Course Information: May be repeated to a maximum of 4 hours. Students may register in more than one section per term. Prerequisite(s): BPS 580; and consent of the instructor and a minimum of 15 hours of credit earned in the M.S. in Forensic Science program.

BPS 593. Research in Biopharmaceutical Sciences. 0-16 hours.
Research in biopharmaceutical sciences with the guidance of a faculty mentor. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Approval of the department.

BPS 594. Special Topics in Biopharmaceutical Sciences. 1-4 hours.
Content varies. Special topics in biopharmaceutical sciences not covered in regular core or elective offerings. Course Information: May be repeated to a maximum of 4 hours if topics vary. Prerequisite(s): Consent of the instructor.

BPS 595. Departmental Seminar. 1-2 hours.
Weekly seminar series on research and experimental techniques in biopharmaceutical sciences. Also consists of journal club at which students will present an article once a year. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Approval of the department.

BPS 596. Independent Study in Forensic Science. 1-8 hours.
Supervised projects may consist of extensive reading or laboratory work, or both, on topics not covered in regular course offerings. Research undertaken for this course may not duplicate that being done for BPS 597 or BPS 598. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Students may register in more than one section per term. Prerequisite(s): Consent of the instructor.

BPS 597. Forensic Science Project Research. 3 hours.
Supervised research in forensic science; a research project to be designed and completed within one semester. Course Information: Satisfactory/Unsatisfactory grading only. Prerequisite(s): BPS 580; and at least the core course in the M.S. in Forensic Science program covering the subject area in which the research is to be conducted and consent of the instructor.

BPS 598. M.S. Thesis Research. 0-16 hours.
For students doing M.S. thesis research or thesis writing. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 10 hours. A minimum of 6 hours is required. Prerequisite(s): Consent of the instructor.

BPS 599. Dissertation Research. 0-16 hours.
Ph.D. thesis research. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

Medicinal Chemistry

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 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 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 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 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.

Pharmaceutical Sciences

PSCI 425. College of Pharmacy Colloquium Lecture Series. 1 hour.
Weekly, one-hour, basic-research seminars given by invited lecturers. Course Information: Previously listed as BPS 425. May be repeated for a maximum of 2 hours. Students will not be able to concurrently enroll in PSCI 425 and PMPR 355 during the Spring semester.

PSCI 501. Drug Discovery, Design, and Development. 3 hours.
Provides an overview of the process to discover, design, develop, and market drugs set in the background of chemistry and biology. Course Information: Credit is not given for PSCI 501 if the student has credit in BPS 507 or MDCH 507 or PMPG 507.

PSCI 502. Training in Research Presentation. 1 hour.
Provides practice and practical guidance for giving a high quality research seminar. Course Information: Satisfactory/Unsatisfactory grading only. Previously listed as MDCH 593.

PSCI 503. Biostatistics for Pharmaceutical Scientists. 2 hours.
Provides an introduction to basic statistical methods for pharmaceutical scientists. Course Information: Extensive computer use required. Credit is not given for PSCI 503 if the students has credit in BSTT 400.

PSCI 504. Science Writing and Storytelling. 1 hour.
Designed to use storytelling to write and communicate science more effectively. Course Information: Satisfactory/Unsatisfactory grading only. Extensive computer use required. Meets eight weeks of the semester. Prerequisite(s): Consent of the instructor.

PSCI 510. Principles of Pharmaceutics and Drug Delivery. 3 hours.
Provides fundamental principles of pharmaceutics and drug delivery. Course Information: Credit is not given for PSCI 510 if the student has credit in BPS 501.

PSCI 519. Principles of Polymeric Science and Engineering. 3 hours.
Intermediate polymer science, thermodynamics of polymer solutions, phase separations, MW determination, crystallization, elasticity, kinetics and processing. Course Information: Previously listed as BPS 522. Prerequisite(s): MATH 220; or consent of the instructor.

PSCI 520. Research Techniques in Pharmacognosy. 3 hours.
Provides an introduction to the techniques used in pharmacognosy research. Course Information: Previously listed as PMPG 510.

PSCI 521. Structure Elucidation of Natural Products. 3 hours.
Provides an in-depth study of structure elucidation and dereplication of a natural product using modern computational methods and real-life examples. Course Information: Previously listed as PMPG 516. Prerequisite(s): MDCH 562; or consent of the instructor.

PSCI 522. Advanced Pharmacognosy. 3 hours.
Provides an in-depth knowledge of the occurrence, biosynthesis and activity profile of biologically active natural products from plants, marine and microbial sources. Course Information: Previously listed PMPG 511. Prerequisite(s): Credit or concurrent registration in PSCI 520; or consent of the instructor.

PSCI 523. Special Projects in Pharmacognosy. 1-3 hours.
Overview of current research topics of interest in Pharmacognosy. Course Information: Previously listed as PMPG 565. Prerequisite(s): Completion of the first year of the program.

PSCI 530. Principles of Medicinal Chemistry. 5 hours.
Introduces concepts of graduate organic and physical organic chemistry as they relate to medicinal chemistry. Emphasis will be made on those topics of chemistry that are relevant to drug discovery and design. Course Information: Previously listed as MDCH 561. Prerequisite(s): Credit or concurrent registration in PHAR 422; or consent of the instructor. Recommended background: One year of organic chemistry with laboratory.

PSCI 531. Spectroscopy in Pharmaceutical Sciences. 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: Previously listed as MDCH 562. Prerequisite(s): Consent of the instructor or one year of physical chemistry.

PSCI 533. 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: No credit is given for PSCI 533 if the student has credit in MDCH 572. Previously listed as MDCH 561 or PSCI 530.

PSCI 591. Internship in Pharmaceutical Sciences. 1-12 hours.
Students spend time working in an entity unaffiliated with the department, such as an industrial or specialized laboratory, to obtain professional experience in a field of pharmaceutical sciences. Course Information: May be repeated. Prerequisite(s): Consent of the instructor.

PSCI 592. Research Rotation in Pharmaceutical Sciences. 1-2 hours.
Research rotation course in which first year students from the Pharmaceutical Sciences program will undertake projects in laboratories affiliated with this program. Course Information: May be repeated to a maximum of 4 hours. Students may register for more than one section per term. Meets eight weeks of the semester. To be taken fall and spring semesters of the first year of graduate study. Prerequisite(s): Consent of the instructor.
Pharmacognosy

PSCI 594. Special Topics in Pharmaceutical Sciences. 1-4 hours.
Covers at least one of the five concentrations of research in pharmaceutical sciences: pharmaceutics & drug delivery, pharmacognosy, chemistry in drug discovery, molecular mechanisms and therapeutics, and forensics. Course Information: May be repeated to a maximum of 4 hours if topics vary. Previously listed as MDCH 594. Prerequisite(s): One year of physical chemistry and one semester of biochemistry or consent of the instructor.

PSCI 598. Master's Thesis Research. 0-16 hours.
Independent research project under the guidance of an advisor. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

Independent dissertation research under the guidance of an advisor and committee. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated. Prerequisite(s): Consent of the instructor.

Pharmacognosy

PMPG 499. Special Projects in Pharmacognosy. 1-3 hours.
Special topics in pharmacognosy dealing with isolation and characterization of natural products.

PMPG 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 MDCH 507.

PMPG 512. Microscopy of Natural Drug Products. 3 hours.
Use of microscopic methods in the identification of natural drugs and herbal products, with emphasis on the use of light and scanning electron microscopes. Course Information: Prerequisite(s): PMPG 517 or consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture.

PMPG 513. Principles of Structure Determination and Analysis. 3 hours.
Explores the relationship between structural stability, kinetic properties and function of biopolymers, with particular emphasis on proteins and nucleic acids. Course Information: Same as BCMG 513. Prerequisite(s): GCLS 501 and one year of physical chemistry, or consent of the instructor.

PMPG 515. Structure Elucidation of Natural Products I. 2 hours.
Learn the basic skills needed to elucidate the structure of a natural product by spectroscopic methods by using real-life examples. Course Information: May be repeated to a maximum of 6 hours. Prerequisite(s): Credit or concurrent registration in MDCH 562 and credit or concurrent registration in PMPG 511.

PMPG 517. Problem-Solving in Plant Taxonomy. 4 hours.
Principles and concepts in plant taxonomy, which include identification, classification, nomenclature, discussion of major recent/modern systems, family characterization and field work methods. Course Information: Prerequisite(s): Consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture-Discussion.

PMPG 518. Correlative Phytochemistry. 2 hours.
Distributional correlation of well-defined groups of secondary phytoconstituents with existing plant classification systems as an aid in the search for biologically active natural products. Course Information: Prerequisite(s): PMPG 517.

PMPG 520. Enthroparmacology Field Work. 4 hours.
Studies of plants used by primitive peoples as medicinal agents, in defined geographic areas, primarily through interviews with medicine men and the populace. Plant material will be collected for subsequent study. Course Information: Contingent on availability of funds for travel support. Prerequisite(s): PMPG 517 or consent of the instructor. Class Schedule Information: To be properly registered, students must enroll in one Laboratory and one Lecture-Discussion.

PMPG 521. Recent Advances in Pharmacognosy. 2 hours.
A review of recent progress in the chemistry, biosynthesis and biological properties of natural products. Course Information: Prerequisite(s): PMPG 511.

PMPG 522. Laboratory Techniques in Biomolecular Sciences I. 3 hours.
Laboratory research rotations as assigned by the Biomolecular Sciences faculty in the three laboratories of the Center for Biomolecular Sciences in the College of Pharmacy. Course Information: Prerequisite(s): Consent of the instructor.

PMPG 523. Laboratory Techniques in Biomolecular Sciences II. 3 hours.
In a continuation of PMPG 522 students will perform laboratory research rotations as assigned by the Biomolecular Sciences track faculty in the laboratories of the Center for Biomolecular Sciences in the College of Pharmacy. Course Information: Prerequisite(s): PMPG 522; or consent of the instructor.

PMPG 534. Dental and Medical Anthropology Within Human Evolution. 1-3 hours.
Studies the biological and physical anthropology of hominid teeth and the craniofacial complex with relevant medical anthropology, ethno-pharmacology, forensic sciences, and paleo-pathology topics. Course Information: Same as ANTH 534 andOSCI 534. Field work required. A lab experience, independent study and a research paper is required for 3 hours of credit. Prerequisite(s): Graduate standing and consent of the instructor.

PMPG 540. Marine Natural Products. 2 hours.
Expose graduate students to field of marine natural product chemistry. Course will include examples of marine antineoplastic agents, marine toxins, and other pharmaceutically relevant marine natural products from various marine organisms. Course Information: May be repeated to a maximum of 6 hours.

PMPG 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 MDCH 553. Prerequisite(s): Consent of the instructor. Recommended background: Molecular and Cellular Biology.

PMPG 569. Predictive Strategies in Pharmacognosy. 2 hours.
Consideration of the methods employed for the selection of plants that are most likely to yield biologically active compounds. Course Information: Prerequisite(s): Demonstration of competency in organic chemistry, botany and pharmacology.

PMPG 590. Laboratory Techniques in Pharmacognosy I. 2 hours.
Perform laboratory research rotations as assigned by Pharmacognosy drug discovery track faculty of Program for Collaborative Research in Pharmaceutical Sciences (PCRPS). Course Information: Prerequisite(s): Credit or concurrent registration in PMPG 510 or consent of the instructor.
**PMPG 592. Laboratory Techniques in Pharmacognosy II. 2 hours.**
In continuation of PMPG 590, student will perform lab research rotations as assigned by Pharmacognosy drug discovery track faculty of the Program for Collaborative Research in Pharmaceutical Sciences (PCRPS) Course Information: Prerequisite(s): PMPG 590 or consent of the instructor.

**PMPG 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.

**PMPG 595. Seminar in Pharmacognosy. 1 hour.**
Presentation on a current research topic. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated to a maximum of 2 hours.

**PMPG 598. Master's Research in Pharmacognosy. 0-16 hours.**
Research for completion of master's degree. Course Information: Satisfactory/Unsatisfactory grading only.

**PMPG 599. Doctoral Research in Pharmacognosy. 0-16 hours.**
Research for students in the pharmacognosy doctoral program. Course Information: Satisfactory/Unsatisfactory grading only. May be repeated.