GRADUATE EDUCATION IN MEDICINAL CHEMISTRY
POLICIES AND PROCEDURES MANUAL

A Reference Guide for Students Concerning
Departmental Policies and Procedures

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The University of Florida Graduate Catalog
Previous manuals prepared by College of Pharmacy graduate faculty
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OVERVIEW OF GRADUATE EDUCATION IN MEDICINAL CHEMISTRY

The department admits students to a program of graduate education leading to the degree of Doctor of Philosophy (Ph.D.) in pharmaceutical sciences with a specialization in medicinal chemistry. The degree program is under the general supervision of the University of Florida Graduate School and the University of Florida College of Pharmacy, but detailed supervision and advisement are from the faculty of the Department of Medicinal Chemistry.

The objectives of the Ph.D. program are

(i) to provide students with a broad training in medicinal chemistry, covering organic chemistry, analytical chemistry, biochemistry, pharmacology and toxicology.

(ii) to guide students in acquiring specialized knowledge, through an individualized program of didactic course work and laboratory research, of one particular area of medicinal chemistry.

(iii) where possible to help graduating students find employment suited to their interests and abilities.

The department does not normally admit students to a laboratory research-based Master of Science in Pharmacy program and will only award such a degree under special circumstances. Students who have spent a minimum of two years in the program may elect to transfer to a master's program for pressing personal reasons which preclude finishing the Ph.D. program. Students whose progress in laboratory research is judged unsatisfactory for a Ph.D. degree, but who have successfully completed course requirements and some laboratory research may be required to switch to a master's degree.
FUNDING OF STIPENDS, COURSES AND RESEARCH COSTS

Students admitted to the department will be paid a stipend for teaching and/or research assistantship appointments. The amount of the base stipend is reviewed annually. Funding of students’ stipends will be for a period of 4 years, or longer if the student is making good progress but extra time is needed and funds are available. Exceptional students may be eligible for additional stipends from the University. Such students will usually have a GPA of greater than 3.5 and a GRE of greater than 310 (1200 under the old system).

ADMISSION TO THE PH.D. PROGRAM

Students who hold U.S. citizenship or permanent residency and hold bachelor's degrees in pharmacy, chemistry, or related sciences from accredited 4 year colleges in the U.S. are given priority in the selection process. The number of places available is somewhat variable, since it depends to some extent on the level of external funding of department faculty. Students are normally admitted to start in the fall semester, but can be admitted at the start of other semesters. Applications for the fall semester are considered by the whole department as applications are received. If any places are available for the spring semester, applicants are considered in October.

Minimum requirements for admission of U.S. citizens and permanent residents are a grade point average (GPA) of 3.0 for the last two years of undergraduate study; a combined verbal and quantitative score of 295 (1000 on the old scale) on the Graduate Record Examination (GRE); and 3 supportive recommendations from faculty who have personal knowledge of the academic capabilities of the candidate. In the case of students who have been away from school for several years, one letter of recommendation may be from a supervisor at his or her place of employment. In addition to normal requirements, all non-US and Puerto Rican applicants must submit IELTS
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(International English Language Testing System), MELAB (Michigan English Language Assessment Battery) or TOEFL (Test of English as a Foreign Language) scores as part of the application process, unless they are citizens of a country where English is an official language, have spent at least one academic year as a full-time student at a college or university in a country where English is an official language, earned a prior bachelor's degree, master's degree or doctoral degree at an accredited university in the United States or have official proof of successfully completing the UF English Language Institute's program before applying.

Florida law requires all non-US students who are going to be graduate teaching assistants — even if exempted from the IELTS, MELAB and TOEFL requirement — to prove adequate command of the English language. Before getting a graduate teaching assistantship, they must submit TSE (Test of Spoken English) or SPEAK (Speaking Proficiency English Assessment Kit) scores that meet the required minimums. Students who are only involved in grading papers do not have to pass the TSE or SPEAK test.

Students who are admitted to UF with English test scores below the required minimums (140 verbal GRE [320 on old scale], 6 IELTS, 77 MELAB, 80 Internet-based TOEFL, 213 computer-format TOEFL or 550 paper-format TOEFL) must take the UF Academic Written English Program's screening test at the start of their first semester at UF. This test is free. If students do not pass this test, they must take and pass EAP 5845 Academic Written English during their first semester in your program.

The successful candidates will be informed of their acceptance into the program in writing, with a letter directly from the graduate coordinator, and asked to inform the department of their intention to take up this offer in writing by the University deadline in April or within 3 weeks. A copy of the letter of offer will be sent with the graduate admissions referral sheet to the office of the
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Dean of the College of Pharmacy, and to the graduate school who will further process the application. In the case of foreign students, the dean's office will forward the acceptance to the Office of International Student Services for the purpose of issuing a visa.

ROLE OF THE GRADUATE COORDINATOR

The graduate coordinator or designee will review admission materials and ensure that requests for information are sent in a timely manner. Department personnel will contact prospective qualified students by telephone if they are in the U.S. and will advise the department faculty as to when the faculty should meet to select students for admission. The graduate coordinator will act as advisor for incoming students in their first semester, if they have not yet selected a mentor. The graduate coordinator will meet with all new students during their first month and ensure that students understand what is expected of them. He or she will oversee the process of selection of an advisor, if the new student does not yet have an advisor. If the student does not have an advisor, the graduate coordinator will assist them with course selection. The graduate coordinator will review grades of each student at the end of each semester and ensure that if any student has a GPA of < 3.0, the student and his/her advisor is notified that he or she is on probation. The graduate coordinator will serve as a contact in the department concerning policies and procedures relating to graduate education. The graduate coordinator and faculty will recommend teaching assistant duties for students to the graduate studies committee (see Teaching Responsibilities, page 15).

FELLOWSHIPS

Students are encouraged to apply for national and graduate school fellowships and awards. Fellowships can be utilized to pay stipends or to supplement departmental stipends up to an additional $5000 and for research and appropriate travel expenses.
VACATIONS

Graduate students are permitted two weeks vacation per calendar year to be taken at a time mutually agreed to by the student and his/her major advisor. **Students should recognize that time taken during semester breaks is included in the two weeks vacation period.** In addition, graduate students are granted the following usual state holidays: New Year's Day; Martin Luther King Day; Memorial Day; Independence Day; Labor Day; Veterans Day; Thanksgiving Day and the day after Thanksgiving; Christmas Day. Students may also take designated University holidays.

Financial support may be terminated for unexcused absences.

SELECTION OF A MAJOR ADVISOR AND SUPERVISORY COMMITTEE

**Major Advisor**

In many cases, students will join the department already committed to a particular major advisor. If a student is accepted without pre-selecting a major advisor, then following admission to the department, that student must make an appointment to meet with every faculty member in the department, during the student's first semester, for the purpose of discussing the faculty member's research. The student will carry an interview sheet which each faculty member must sign to indicate that an interview took place. When the student has interviewed all faculty, the student must decide on an advisor. Once the selected advisor has agreed to act in that capacity, the student and selected faculty member sign the interview sheet, and the sheet is maintained in the department as part of the student's record. Students should have selected an advisor by the end of their first semester.
Changing Major Advisor

Changing a research advisor is very costly to both the student and faculty member involved. Research programs are not transferable from one advisor to another, time is wasted and the student must recall that the department will only provide a stipend for four years. However, if the move is deemed necessary, the following protocol should be followed.

1. The student must first discuss the change with his/her advisor.
2. The student and faculty member should both submit a letter of explanation to the department. The faculty member's letter should contain an overall evaluation and appraisal of the situation.
3. The department chairman will evaluate the letters and discuss them with both individuals. The chairman will then make a decision concerning the requested change.
4. All notebooks and pertinent papers must be left with the initial advisor unless permission to transfer them is obtained from the initial advisor.

Supervisory Committee

As soon as possible, but no later than the end of the student's second semester in the department he/she should have a supervisory committee consisting of at least 4 members of the graduate research faculty. The composition of this committee must be on file with the department and the Graduate School. Failure to do this may result in the Graduate School flagging the record. The composition of the committee should reflect the anticipated research project. At least two other members of the committee (apart from the major advisor) must be from the Department of Medicinal Chemistry. There should be no more than 2 other faculty from any other single department. One member of the committee should be designated the "external member," in accordance with Graduate School policies. This person should represent a discipline which is not
the major discipline of the Ph.D. The supervisory committee should be selected by the committee chairperson in conjunction with the student. The composition of the committee must be approved by the department chairperson and the Associate Dean for Research and Graduate Education of the College of Pharmacy, and will be formally appointed by the Dean of the Graduate School.

Although a full committee must be present for the exam, if one committee member can not attend the exam, a suitable substitution may be utilized. This, however, does not apply to the chairman or the external member.

**Chairman and Co-Chairman**

In unusual cases doctoral research may require the guidance of a specialist in an area of study other than that of the supervisory committee chairman. In such cases the department chairman may recommend appointment of a co-chairman who is on the doctoral faculty.

**Other Members of the Supervisory Committee**

Courtesy faculty and faculty not appointed to the Graduate Faculty shall not be included on the official supervisory committee. They may attend the final oral examination, and must sign the form for **Final Examination Report**.

**Duties of the Supervisory Committee**

1. To inform the student of all regulations governing the Ph.D. degree. This does not absolve the student from the responsibility of becoming informed of these regulations.

2. To meet immediately after appointment to review the student's qualifications, his/her planned program of study, and his or her proposed dissertation research project.

3. To conduct the qualifying examination.
4. It is recommended that the Supervisory committee meet at least once a year regarding the student progress. However, the supervisory committee should meet at least once between the qualifying exam and the defense.

5. To conduct the final oral examination. No fewer than four faculty members including the supervisory committee shall be present. The four faculty shall be graduate faculty and full time tenure track.

MEDICINAL CHEMISTRY COURSE REQUIREMENTS FOR PH.D. STUDENTS

The required courses are listed below. The remainder of the 90 credit hours are to be settled on by the student and his/her supervisor. A minimum of six 3-credit courses are expected. IF STUDENTS TAKE COURSES AT 4000 LEVEL OR BELOW, THESE WILL NOT COUNT TOWARDS THE CREDITS NEEDED FOR THE Ph.D. DEGREE. Also, courses in the Pharm. D. curriculum do not count towards the departmental core course requirements. Incoming students with a Master’s degree may be able to transfer or have recognized up to 9 credits from previous graduate level didactic courses, upon approval by the graduate faculty in Medicinal Chemistry. All students must have their course selection approved in writing by their major advisor (or the graduate coordinator in the first semester), using the course registration form.

**Chemistry**

The student needs to take a spectroscopy course, either CHM 5235 offered each Autumn or PHA 6356 offered every other year; in addition, the student may take the following courses:

- CHM 5224, 3 credits, Basic Principles of Organic Chemistry
- CHM 5235 3 credits, Organic Spectroscopy
- CHM 6225, 4 credits, Advanced Principles of Organic Chemistry
- CHM 6226, 3 credits, Advanced Synthetic Organic Chemistry
Biochemistry

Students with no previous upper-level coursework in Biochemistry must take one or more of the following courses.

- BCH 4024, 4 credits, Introduction to Biochemistry and Molecular Biology (Note–this course will not count towards the Ph.D., but may be needed to correct deficits in undergraduate education).
- BCH 5413, 3 credits, Eukaryotic Molecular Biology and Genetics
- BCH 6206, 3 credits, Advanced Metabolism
- BCH 6415, 3 credits, Advanced Molecular and Cell Biology
- BCH 6740, 3 credits, Advanced Physical Biochemistry

Pharmacology

Students with no previous upper-level coursework in Pharmacology have the option to take one course in Pharmacology (GMS 6009, Principles of Drug Action is an example), since an understanding of basic pharmacological principles is fundamental to modern Medicinal Chemistry. Several courses are available.

Advanced courses in Medicinal Chemistry

Students must take the following two courses, which are taught by all departmental faculty.

- PHA 6447, 6 credits, Drug Design (3 credits each semester, two semesters in total)
- PHA 6934, 1 credit, Seminar in Medicinal Chemistry. The seminar must be attended by all students during the time they are in the department, and they must make presentations as requested. In their final year, students will be required to present their thesis research at a departmental seminar.
Students must take at least two of the following five didactic courses, which are offered by department faculty.

PHA 6425, 3 credits, Drug Biotransformation and Molecular Mechanisms of Toxicity
PHA 6356, 3 credits, Structure Determination of Complex Natural Products
PHA 6935, variable credits (1-3), Selected Topics in Medicinal Chemistry
PHA/CHM 6435, 3 credits, Biosynthetic Logic of Medicinal Natural Products
PHA 6472, 3 credits, Organic Synthesis of Drug Molecules

Other course numbers listed in the graduate catalog are for reading courses, (PHA 6936) which may be offered as needed from time to time by any faculty, and for laboratory research projects (PHA 6905L, 6910 up to 5 credits) or thesis and dissertation research (PHA 6971, Research for Master's Thesis; PHA 7979, Advanced Research; PHA 7980, Doctoral Research). The course PHA 6905C, Research Procedures in Medicinal Chemistry, normally takes the form of a literature review in a specialized area of medicinal chemistry, combined with related laboratory research. This course requires a written exam or paper and may be taken for a letter grade of 1 to 4 credits per semester, up to a maximum of 12 credits. PHA 6905C may not be taken while a student is on probation (see page 15).

Other appropriate courses may be offered by the Chemistry Department, Pharmaceutics Department, Biochemistry Department, Statistics Department or other departments according to the program of the individual student.

It is also recommended that students take an advanced statistics course such as STA 6116 and a course on responsible conduct of biomedical research, such as BMS 7003 (1 credit).

**INTERDISCIPLINARY TOXICOLOGY PROGRAM**
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The Department of Medicinal Chemistry also participates in the University-wide Interdisciplinary graduate program in Toxicology. Students wishing to specialize in Medicinal Chemistry with a concentration in Toxicology must, in addition to departmental requirements take the following Toxicology courses:

VME 6602, 3 credits, General Toxicology
VME 6603, 3 credits, Advanced Toxicology

And one of the following three electives:

GMS 7593, 2 credits, Functional Genomic Applications in Pharmacology and Toxicology
VME 6606, 3 credits, Aquatic Toxicology and Ecological Risk Assessment
VME 6607, 4 credits, Human Health Risk Assessment.

One of the departmental courses taken by toxicology students must be PHA 6425. Students interested in toxicology must take an advanced Statistics course such as STA 6116.

STUDENT RECORDS

All application material, correspondence, copies of transcripts, grade sheets and other pertinent materials will be kept in a file to be maintained in the department. This material is confidential and will only be available to the graduate coordinator, the department chairman, members of the supervisory committee and the graduate dean. Most of this information will also be held in the Office of the Dean and will also be held confidentially.

ACADEMIC PROGRESS

Students are required to maintain a GPA of at least 3.0 to stay in the graduate program. Passing grades for graduate students are A, A-, B+, B, B-, C+, C and S. At the end of every semester, each student is responsible for providing a copy of his/her grades from that semester to the graduate coordinator and major advisor for review. The policy on grades below a B in a required
course is as follows: D, D+ and C- must be repeated. On receiving a C, C+ or B- in a required graduate course, the faculty has the option of requiring the student to repeat the course. While the decision is a Departmental one, it will depend heavily on the advice of the student's immediate advisor. It is the primary responsibility of the major advisor to assure quality performance by his/her student. It is the responsibility of the major advisor to document, in writing, unacceptable performance by a student. This documentation should be placed in the student's file. Each year, a written evaluation of each student's progress must be made by the major advisor, countersigned by the student, and placed in the student's record.

**PROBATION**

A student whose GPA falls below 3.0 will be allowed one semester on probation to make up the deficit. The graduate coordinator or major advisor will write a letter to the Dean of the Graduate School requesting that the student be allowed one semester on probation. If the student goes on probation, the Department will assume the tuition fee waiver only once in the course of the student's matriculation. The course PHA 6905C may not be taken during the semester a student is on academic probation. Students who fail to raise their GPA above 3.0 by the end of the semester that they are on probation will normally be required to leave. Under exceptional circumstances, students may request a further extension. This request will be reviewed by the major advisor and the graduate coordinator, and if a further extension is recommended this must be approved by the department chairman and the Dean of the Graduate School.

**TEACHING RESPONSIBILITIES**

Every student supported by the department must assist in grading or teaching courses in medicinal chemistry to professional pharmacy students. Foreign students must pass TSE or SPEAK
before they are allowed to serve as teaching assistants and must arrange to take the TSE as soon as possible after their arrival. This is not a requirement for assistants in grading. The graduate coordinator, in consultation with the faculty teaching the course, will recommend TA duties to the graduate studies committee, who will make the assignment. Students who are assigned duties as a teaching assistant will then report to the faculty member(s) in charge of the course.

QUALIFYING EXAMINATION

All students must pass a qualifying examination before being formally admitted as a candidate for the Ph.D. degree (admitted to candidacy). Before taking the qualifying examination, the student must have a minimum 3.00 GPA and must have completed (or almost completed) the course work that will be taken for a letter grade in his/her program. Exceptions can be made with approval by the student’s supervisory committee and the department faculty. The qualifying exam will have written and oral components. The written questions will be designed by each committee member in addition to a question prepared by a department faculty member not on the committee. If, however, there are three members of the committee from the department, the latter question will be unnecessary. The student will be allowed to take the test under an open book format and will be allowed one week to complete the test and hand it in to the committee chair. The supervisory committee will determine whether or not the candidate has passed the written test. After satisfactory completion of the written portion, the oral will be administered. At least five working days before the oral exam is to be conducted, formal notices must be sent to all departmental and college faculty and committee members. The oral part of the exam will consist of a presentation of the research proposal of the student and of results obtained so far in the laboratory. All members of the supervisory committee (or designated alternates) must be present at the oral part of the exam: a total of four faculty must be present.
Time Lapse

Between the successful completion of the qualifying examination and the date of the degree, there must be a minimum of two semesters. The semester in which the qualifying examination is passed is counted provided that the examination occurs before the midpoint of the term.

Time Limitation

All work for the doctor's degree must be completed within five calendar years after the qualifying examination, or this examination must be repeated.

ADMISSION TO CANDIDACY

Formal admission to candidacy is that time when the graduate student becomes an actual candidate for the Ph.D. degree. Such admission requires approval of the student's supervisory committee, the chairman of his or her department, the College Dean and the Dean of the Graduate School.

The application form Admission to Candidacy must be completed after passing the qualifying examination. The approval must be based on (a) academic record of the student, (b) the opinion of his or her supervisory committee concerning his or her overall fitness for candidacy, (c) an approved dissertation topic, and (d) successful results on the qualifying examination.

DISSERTATION

Every candidate for a doctoral degree is required to prepare and present a dissertation that shows independent investigation and is acceptable in form and content to his or her supervisory committee and to the Graduate School. Since all doctoral dissertations will be published on the
Internet, it is necessary that the work be of publishable quality and that it be in a form suitable for publication. Dissertations should be prepared in the format specified by the Graduate School.

**Publication of Dissertation**

All candidates for the Ph.D. degree are required to sign an agreement regarding electronic publication.

**Copyright**

The candidate may, for a charge, choose to copyright the dissertation. To assure receipt of the valuable Copyright Registration Certificate, the candidate must give a permanent address through which he/she can always be reached.

**FINAL EXAMINATION**

After first submission of the dissertation to the Graduate School and completion of all other work for the degree, and in no case earlier than six months before the conferring of the degree, the candidate will be given a final examination, oral or written or both, by the supervisory committee.

**Announcement of Final Examination**

An announcement of the scheduled examination and an abstract must be submitted in writing to the Dean of the Graduate School by the chairman of the supervisory committee at least 10 working days before the exam. An announcement of the examination must be sent to faculty members in the College of Pharmacy including the supervisory committee, inviting them to attend.

**Members Required at the Examination**

At least four faculty members must be present at the oral portion of the final examination. This includes all supervisory committee members. At the oral examination the candidate will
present a 45 minute open seminar to the department and other interested persons on his or her
dissertation research, and answer questions from the floor. The examination will then be closed for
further questioning by the committee and other faculty members.

Signatures

Assuming the candidate is successful, then the Final Examination Report shall be signed by
the four faculty members conducting the exam (see Members Required, above). The dissertation is
to be signed by the official members of the supervisory committee, the Department Chair and the
College Dean. The signed Final Examination Report will be submitted electronically to the
Graduate School after the dissertation has been corrected and all signatures obtained.

Certification

Doctoral candidates who have completed all requirements for the degree, including
satisfactory defense and final acceptance of the dissertation, may request certification to that effect
prior to the receipt of the degree. Certification Request Forms, available in the Graduate School
Editorial Office, should be filled out by the candidate, signed by the graduate coordinator and the
Dean of the College of Pharmacy or his representative, and returned to the Graduate School for
verification and processing.

SUMMARY OF SUGGESTED TIMETABLE FOR THE PH.D. STUDENT

Year one
First semester: course work as decided by student and graduate
coordinator; interview faculty; select major advisor (if not selected
upon admission). Second semester: course work; start laboratory
research, form supervisory committee. Third semester: course
work; research

Year two
Course work, research
Year three  Research, preparation and execution of qualifying exam

Year four  Research

Year five  Writing dissertation, preparing for final examination, considering employment options,

SPECIFIC REQUIREMENTS FOR THE MASTER OF SCIENCE IN PHARMACY/WITH A SPECIALIZATION IN MEDICINAL CHEMISTRY

Thesis Masters Degree Requirements

Unless otherwise specified, for any master's degree, the student must earn a minimum of 30 credits including no less than 24 credits of regular course work and up to 6 credits in thesis research as a graduate student at the University of Florida, of which no more than 6 semester hours of graduate level course work earned with a grade of A, A-, B+ or B may be transferred from institutions approved by the Dean of the Graduate School.

Major

At least 50% of the minimum course work, exclusive of 6971, for a master's degree must be in courses open only for graduate credit (5000 and above) in a field of study designated the major.

Minor

If a minor is chosen, at least 6 credits of work are required; two 6-credit minors may be taken. Minor work must be in a department other than the major. A student does not have to select a minor, but the nonmajor course work must be taken outside the major department and must be 3000 level or above.

Credits and Grades

The student must have a minimum 3.00 GPA for all course work attempted for the degree, and as well, a minimum 3.00 GPA for course work in the major. See Page 15, Academic Progress, for additional information.
Thesis

The candidate is required to prepare and present a thesis acceptable to his/her supervisory committee and the Graduate School. He/she should consult the Graduate School for instructions concerning the form of the thesis and the date when the thesis is to be submitted to the Graduate School.

Supervisory Committee for the Master of Science in Pharmacy

At least two members selected from the Graduate Faculty must be on the supervisory committee. These members are recommended by the student's department chair, approved by the College Dean, and appointed by the Dean of the Graduate School. The Dean of the Graduate School is an ex-officio member of all supervisory committees. If a minor is designated, it should be represented by one member on the committee. The committee should be appointed as soon as possible, and no later than the end of the second semester.

Only members of the Graduate Faculty can be listed officially on the supervisory committee. Names of courtesy faculty, regular faculty, and others not on the Graduate Faculty may not appear on the student's official supervisory committee.

At least three faculty members must be present at the student's final examination, but only members of the official supervisory committee are required to sign the thesis and the report of the final examination.

Residency Requirement

There is no residency requirement for the master's degree.

Admission to Candidacy

Admission to candidacy is no longer required for students pursuing master's degrees.
Final Examination

A written announcement of the examination is sent to the Graduate School Dean and all Faculty in the College of Pharmacy.

When all of the student's course work is completed, or practically so, and the thesis is in final form, his or her supervisory committee is required to examine him or her in writing or orally on his or her thesis and the subject matter of the courses taken for the degree. Using the form Report on Thesis/Dissertation and Final Examination, this should be completed and signed by the official members of the committee, and then by the College Dean, this should then be submitted to the Graduate School.

The final examination may not be held any earlier than six months before conferring the degree.

Time Limitation for Completion of the Master of Science in Pharmacy

All work (including transfer credit) counted toward the M.S. degree must be completed during the seven years immediately preceding the date on which the degree is to be awarded.

Correspondence and Extension Work

No courses may be taken for graduate credit by correspondence. No extension courses may be used for graduate credit.

NON-THESIS MASTERS DEGREE REQUIREMENTS

For a non-thesis Masters degree, students must take 30 hours didactic course work (this may include up to 5 credits PHA 6910, up to 3 credits of PHA 6934), of which 9 hours may be transferred from another program.
MINOR IN MEDICINAL CHEMISTRY REQUIREMENTS

Students from other departments or colleges who wish to take a minor in Medicinal Chemistry must take, at a minimum, six didactic credit hours of courses in Medicinal Chemistry, of which three credits must be PHA 6447, Drug Design. The student should have a member of the Medicinal Chemistry graduate faculty on their supervisory committee. The student should either make a presentation at the departmental seminar at least once, or take a third Medicinal Chemistry course.