

# COLLEGE OF PHARMACY

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# COLLEGE OF PHARMACY

## Accreditation

The College of Pharmacy holds membership in the American Association of Colleges of Pharmacy, is recognized as an institution in good standing by the Ohio State Board of Pharmacy, and is accredited by the Accreditation Council for Pharmacy Education (ACPE).

## Programs in Pharmacy and the Pharmaceutical Sciences

The College of Pharmacy prepares students for careers in the pharmaceutical sciences and the profession of pharmacy. Those who do not seek professional licensure may work in the medical, legal and biomedical professions. Those who enter the profession of pharmacy provide direct patient care services.

## Doctor of Pharmacy – Pharmacy Licensure Program

All students seeking a degree that will lead to pharmacy licensure will need to complete two years of course work in the preprofessional division of the College of Pharmacy. Following the completion of a core set of required courses, students will apply to the professional division during their second year. Admission to the professional division of the college (third year) is competitive.

The program of study leading to pharmacy licensure for entering freshmen is the entry-level doctor of pharmacy (Pharm.D.). Students who have already completed a bachelor of science in pharmacy degree may enroll in the post-baccalaureate Pharm.D. degree program in order to gain additional skills and knowledge in various therapeutic areas.

## Pharmaceutical Sciences

The College of Pharmacy offers a four-year bachelor of science in pharmaceutical sciences degree to prepare students for a variety of careers in the pharmaceutical and biotechnological industries. Students seeking the degree will need to complete two years of course work in the preprofessional division of the College of Pharmacy. Following the completion of a core set of required courses, students will apply to the professional division during their second year. Admission to the professional division of the college is competitive. The bachelor of science in pharmaceutical sciences degree will not prepare students for state board licensure, nor will it prepare students to practice pharmacy.

## Pharmacy Graduate Degree Programs

The College of Pharmacy offers several nonlicensure graduate degrees – the master of science in pharmaceutical sciences degree with program options in pharmacology/toxicology, industrial pharmacy and administrative pharmacy; the master of science in medicinal chemistry degree; and the doctor of philosophy in medicinal chemistry degree. Students should contact the College of Pharmacy for admission and curricular requirements.

A graduate certificate program is available to any qualifying student holding a B.S. degree in natural science who wishes to take graduate-

level courses in pharmacology and toxicology. Students completing this 15-semester-hour program will be awarded a certificate in pharmacology/toxicology.

## Admission to the College

### New Students

New students admitted to the College of Pharmacy will begin their studies in the preprofessional division. All undergraduate students in the College of Pharmacy will be considered preprofessional division students until admitted to the professional divisions of the Pharm.D. or bachelor of science in pharmaceutical sciences program. For the entry-level Pharm.D. and the four-year bachelor of science in pharmaceutical sciences programs, the College of Pharmacy limits student enrollment into the professional division (third year) in accordance with its facilities.

### Contingent Admission

A small group of academically exceptional high school graduates may be offered contingent admission to the professional division of the Pharm. D. or the bachelor of science in pharmaceutical sciences programs. Automatic admission to the third year of the curriculum will be contingent on successful completion of the first and second preprofessional years, while maintaining specific scholastic standards.

### Transfer and Change-of-College Students

In order for a student to transfer from other Ohio universities into any of the baccalaureate programs of the College of Pharmacy or change from another college within The University of Toledo to the College of Pharmacy, the student must have a higher education cumulative grade point average (GPA) of at least 2.7 (this is based on all letter grades attained at all institutions of higher learning and uses the point average scale of A equaling 4 points), be in good standing at the University, and be eligible to return. Evaluation of transcripts from other institutions is not done until a student is admitted to the College of Pharmacy. The student may be required to take placement tests in English, chemistry and/or algebra. A student who has attended another Ohio college of pharmacy must have a cumulative higher education GPA of 2.7, be in good standing at the university, and be eligible to return to the college of pharmacy previously attended. Transfer students who wish to apply to the professional division must have been enrolled in The University of Toledo College of Pharmacy and registered for 16 semester hours (a letter grade must be received in each course) prior to application to the professional division.

Students with course work from non-Ohio institutions will be evaluated on an individual basis. After a student is admitted, the student may be asked to supply nonreturnable college catalogs so that course equivalencies can be determined. The student also may be required to take placement tests in English, chemistry and/or algebra. All international transcripts submitted by transfer students must be evaluated by a College of Pharmacy-designated independent agency, at the applicant's expense, for letter grade equivalency. Transfer students are only admitted to the preprofessional division of the B.S. in pharmaceutical sciences or the Pharm. D. program. For a transfer student to be accepted into the second year of the program, all criteria and prerequisites for second-year class standing must be met. Second-year class standing begins only in the fall semester. Highly qualified students who will have earned bachelor degrees and will have met all prerequisites may be reviewed for admission directly to the professional division of the Pharm.

D. program. Admission may be granted only on a space-available basis after all qualified internal candidates have been admitted.

## General Criteria for Admission to the Professional Divisions of the Doctor of Pharmacy and the B.S. in Pharmaceutical Sciences

Students are admitted to the professional divisions for the fall semester. The number of students who receive final acceptance into the professional divisions will be limited to the space available. Because the number of applicants usually exceeds the number of spaces available, students are admitted on the basis of the following general criteria.

### Eligibility for Application

To be eligible to apply for admission into the professional divisions, all applicants must complete the following or their equivalents:

- BIOL 2150, 2160, 2170 and 2180
- CHEM 1230, 1240, 1280, 1290, 2410 and 2460
- MATH 1750
- PHCL 2600
- PHPR 2010
- PHYS 1750 or 2070
- A minimum of 44 earned semester hours
- A minimum 2.7 cumulative and science GPA
- Currently matriculated in The University of Toledo College of Pharmacy

### Application

Applicants to the Pharm.D. program will provide the admissions committee with a personal essay to be written at a designated time, date and location as indicated on the College of Pharmacy internal admissions Web site. At the time of the writing of the personal essay, all application materials must be submitted. These include the following:

- Signed confirmation form
- Pending grade change form (if applicable)
- Two signed letters of recommendation
  - Note: The letters may be from professors, employers, clergy, close family friends and family health professionals (pharmacist, dentist and physician), or others. Letters from relatives or The University of Toledo College of Pharmacy faculty or staff are not acceptable.

Applicants to the bachelor of science in pharmaceutical sciences programs will submit the following by the deadline published on the College of Pharmacy Internal Admissions Web site:

- Signed confirmation form
- Pending grade change form (if applicable)

There are no exceptions to the deadlines.

### Final Admission

In order to be finally admitted into the professional division, an applicant must have completed the following or their equivalents:

- BIOL 2150, 2160, 2170 and 2180
- CHEM 1230, 1240, 1280, 1290, 2410, 2420, 2460 and 2470

- MATH 1750 and 1760
- ECON 1200
- PHCL 2600 and 2620
- PHPR 2010
- PHYS 1750 or 2070/2080
- A minimum of 63 earned semester hours
- Maintain a minimum 2.0 GPA (cumulative and semester) for the spring and, if applicable, summer semesters

If an applicant is accepted into the professional division, the acceptance will be provisional, pending the completion of the above requirements. All course prerequisites for the professional divisions must be completed two weeks before the first day of professional division classes in the fall semester for which the application is made. If the applicant fails to meet the deadline for the completion of prerequisite courses, he/she will lose provisional admission status and must apply again for admission to the professional divisions in a subsequent year. It is the student's responsibility to contact the coordinator of internal admissions in the Office of Student Affairs if he/she plans to complete requirements over the summer prior to the start of the third year. A preprofessional division student will not be allowed to fulfill requirements for the professional divisions by enrollment in organic chemistry and physics during the summer prior to the first professional division year.

### Evaluation

Each application will be evaluated on the basis of the applicant's:

- Personal essay (for Pharm.D. applicants only)
- Personal interview at the discretion of the committee (for Pharm.D. applicants only)
- Cumulative GPA
- Science GPA in the following specified courses:
  - CHEM 1230, 1240 and 2410
  - BIOL 2150 and 2170
  - MATH 1750
  - PHYS 1750 or 2070
  - PHCL 2600

The admissions committee will use the better grade for the first two of all attempts for any science course used in the calculation of the science GPA. This rule applies to all applicants, including transfer students. All transfer or quarter courses equivalent to these specified courses will be evaluated for their respective equivalent semester hours. All applicants must have a cumulative GPA based on a minimum of 16 semester hours at The University of Toledo (a letter grade must be received in each course). If a student has taken fewer than 30 quality hours at The University of Toledo, the higher education GPA will be used in the evaluation in place of the UT cumulative GPA, if the higher education GPA value is less than the UT cumulative GPA. If the higher education GPA is greater than the UT cumulative GPA, the latter will be used.

### Transfer Students

Specific criteria have been approved by the faculty of the College of Pharmacy for the application of transfer students or of change-of-college students to the professional divisions. These are outlined as follows:

- a) Transfer students who wish to apply to the professional division must have been enrolled in The University of Toledo College of Pharmacy and registered for 16 hours (a letter grade must be received in each course) prior to application.

- b) The general criteria for admission to the professional divisions will be applied to the transfer student in the same manner as for the continuing College of Pharmacy student; i.e., cumulative GPA, science GPA, essential courses or their equivalents through the fall semester of the second year, personal essay, personal interview (for Pharm.D. applicants), and an accumulation of at least 44 earned semester hours. The applicant's cumulative GPA from The University of Toledo or higher education GPA (as described previously), science GPA based on equivalent specified courses (UT or otherwise) as stated above, personal essay and personal interview (for Pharm.D. applicants) will be used in determining admission.
- c) The essential courses for final admission to the professional divisions consist of those listed previously. Equivalencies must be determined and appear on the student's transcript and/or in the student's degree audit prior to application. In general, a three-quarter course sequence is necessary to fulfill a two-semester course sequence. See an adviser for further information.
- d) In surveying the essential courses, the admissions committee has observed that equivalency is almost automatic for courses in general chemistry, general biology, organic chemistry and physics. Difficulty in determining equivalency has occurred with Introduction to Patient Care, the mathematics sequence and the functional anatomy and pathophysiology sequence.
- e) The only pharmacy courses a preprofessional student is permitted to take through the College of Pharmacy are PPHR 1000 and 2010 and PHCL 2220, 2600 and 2620, until final admission to the professional divisions is achieved.

## College of Pharmacy Honors Program

The College of Pharmacy offers an Honors Program for eligible students in all its undergraduate programs as part of the University-wide Honors Program. Highly qualified students entering the University in the College of Pharmacy will be considered for entry into honors courses and honors sections of major courses offered in the first two years. Decisions regarding entry of students into the University Honors Program will be made after evaluation of the honors application by the University Honors Program director and the College of Pharmacy honors advisers. Normally, entering students with an ACT composite score of 28 and above, coupled with a 3.75/4.00 high school GPA, will be considered for entry into honors courses. During the first two years of study, the College of Pharmacy offers courses that orient the student toward the profession of pharmacy and the pharmaceutical sciences and toward the moral and ethical responsibilities of pharmacists and pharmaceutical scientists. Many honors students take most of their honors course work (required and elective courses) during the first two years of the curriculum.

A variety of required and elective courses also are offered with honors sections in the professional divisions. A specific honors seminar course and an honors thesis option are offered to fulfill the requirements for graduation with honors. These courses also can fulfill requirements for electives. In addition to the overall college requirement, specific departmental requirements, on file in the respective department offices, must be met for graduation from the College of Pharmacy with honors.

The bachelor of science in pharmaceutical sciences with college honors is attainable by all students who complete at least 33 semester hours of

honors course work with a grade of B or better and who have a minimum cumulative GPA of 3.3. In addition, at least five hours of the 33 must be taken within the honors thesis project and honors seminar. These courses are to be taken within the departments of medicinal and biological chemistry, pharmacology, or pharmacy practice. Graduation with departmental honors also is available to students who are not members of the University Honors Program, but who meet departmental honors requirements. These departmental honors requirements are a GPA of 3.2 or higher and completion of eight hours of honors course work in one department, including the honors thesis and seminar.

## Academic Policies

The College of Pharmacy adheres to all of The University of Toledo policies and procedures. Please refer to the General Section of this catalog for academic policies governing all students enrolled at the University. In any case in which University, college and/or departmental policies conflict, the most stringent policy applies, unless waived by the college. Students should consult with the college for a complete listing of all policies and procedures specifically related to the College of Pharmacy.

## Attendance Requirements

Students in a professional school, as responsible individuals, are expected to attend all class meetings. The maximum number of permissible absences in a course is at the discretion of the individual faculty member. The penalty for excessive absences will be determined by the faculty member in accordance with the University's Missed Class Policy.

## Withdrawal, Grade Deletion and Audit Policy

*Refer to the University General Academic Policies in the General Information section of this catalog for Drop, Withdrawal, Grade Deletion and Audit policies that apply to all students.*

## Pass/No Credit (P/NC) Grade Option

Refer to the University General Academic Policies in the General Section of this catalog for General Academic Policies that apply to all students. P/NC grading is not available for courses taught in the College of Pharmacy. In addition to courses for which P/NC grading is used exclusively, a student may elect P/NC grading for an additional seven credit hours, excluding course work in the natural sciences (biology, chemistry, physics and mathematics with the exception of developmental math). These seven P/NC hours are applicable only to courses in humanities/fine arts, multicultural studies and social sciences. Once the petition is filed, the request is irrevocable.

## Personal Fitness

The emotional and psychological stability of those practicing or preparing to practice pharmacy is considered to be very important for the proper performance of professional responsibility as a member of the health team. The faculty of the College of Pharmacy recognizes that, if a student exhibits behavior suggesting an emotional or psychological abnormality bearing a reasonable relation to that student's ability to function competently in health-care delivery systems, such behavior may present a hazard not only to the student, but also to patients. If any behavior pattern provides reason to believe that a student's psychological or emotional state may



have rendered that student incompetent or unsafe, the dean of the college shall meet with that student and attempt to resolve the situation by referral to the University Health Service, University Counseling Center and/or withdrawal from the pharmacy program.

## Ethical Responsibility

The most serious offense with which pharmacy students may become involved is the misuse of and/or dependence upon dangerous drugs. The College of Pharmacy views the admitted or proven personal abuse of such drugs, their transmittal or sale to other individuals, or the use of drug documents to illegally obtain controlled or legend drugs as unprofessional conduct, which may result in dismissal from the College of Pharmacy. In addition, boards of pharmacy may revoke the internship license and/or deny licensure for various drug offenses. Since an internship license is necessary for entrance into the experiential rotations in the required component of the College of Pharmacy curriculum, students without an internship license will be denied admission into these classes. Drug abuse in any form and/or misuse of drug documents must be avoided.

## Academic Performance Standards

Please refer to the General Section of this catalog for General Academic Policies governing all students enrolled at the University.

For students entering into the professional division of the B.S.P.S. Pharm. D. major program:

- a) Students must maintain a cumulative pharmacy core-curriculum GPA of 3.0. Beginning in the first year of the professional division, students whose semester or cumulative pharmacy core-curriculum (see below) GPA falls below 3.0 will be given an academic warning, and allowed one semester to restore their GPAs to a semester or cumulative pharmacy core-curriculum level of 3.0. A student with two or more consecutive semesters with a semester or cumulative pharmacy core-curriculum GPA of less than 3.0 will undergo a record review by the College of Pharmacy Academic Performance Committee that may result in dismissal from the Pharm.D. program.
- b) A grade below a C (2.0) in any pharmacy core-curriculum course is unsatisfactory and will not be considered a passing grade for the course in the Pharm.D. curriculum (i.e., courses for which grades of less than a C are earned must be repeated).
- c) Grade deletion for undergraduate courses will be allowed, in accordance with the policies of The University of Toledo.

For all undergraduate students in the preprofessional division and in the professional division of the bachelor of science in pharmaceutical sciences, pharmacology/toxicology, medicinal and biological chemistry, pharmaceuticals, and pharmacy administration majors in the College of Pharmacy:

- a) Any student who fails to achieve a semester or cumulative GPA of 2.0 or greater at the end of any semester will automatically be placed on probation.
- b) Any student who fails to achieve a semester or cumulative GPA of 1.0 or greater at the end of any semester will automatically be placed on probation, will undergo a record review by the College of Pharmacy Academic Performance Committee, and may be suspended (see section on suspension below) from the University without a preliminary probationary semester.

- c) Any student who fails to achieve a semester or cumulative GPA of 2.0 or greater for any two of three consecutive semesters in attendance will undergo a record review by the College of Pharmacy Academic Performance Committee, and may be suspended (see section on suspension below) from the University.

For students entering the post-B.S.P.S. portion of the Pharm. D. curriculum:

- a) Students must maintain a minimum GPA of 3.0. This GPA will be computed beginning from the first semester of the post-bachelor of science in pharmaceutical sciences course work and will include all graduate-level courses (see below). Students whose semester or cumulative pharmacy core-curriculum GPA falls below 3.0 will be given an academic warning and allowed one semester to restore their GPA to a semester or cumulative pharmacy core-curriculum level of 3.0. A student with two or more consecutive semesters with a semester or cumulative pharmacy core-curriculum GPA of less than 3.0 will undergo a record review by the College of Pharmacy Academic Performance Committee that may result in dismissal from the Pharm.D. program.
- b) A grade below a C (2.0) in any pharmacy core-curriculum course is unsatisfactory and will not be considered a passing grade for the course in the Pharm.D. curriculum (i.e., courses for which grades of less than a C are earned must be repeated).
- c) Grade deletion for graduate courses is not allowed by the University.

## Suspension

Suspension is made by the dean on advice from the College of Pharmacy Academic Performance Committee, which reviews the performance of all students periodically. Suspension is from the University. The period of suspension is at least one semester, exclusive of the summer terms. A student who is suspended must petition the dean for readmission, in writing (with a copy to the associate dean for student affairs), at least five weeks prior to the beginning of the semester to which the petition is directed. If the petition is accepted, the college will determine the conditions under which the student will be permitted to re-enroll. If a student is readmitted and does not perform satisfactorily, permanent dismissal from the College of Pharmacy may result. A student who is on academic or disciplinary probation or suspension will be required to relinquish the duties of any office in the College of Pharmacy organizations until the student is in "good academic standing," as defined below.

If a student is suspended, and therefore is ineligible to attend classes in a subsequent semester, that student must drop all of the courses for that semester.

## Good Standing

The College of Pharmacy defines "good academic standing" in the following manner:

- a) For all preprofessional students, and professional division students in the bachelor of science in pharmaceutical sciences program (pharmacology/toxicology, medicinal and biological chemistry, pharmaceuticals and pharmacy administration majors): a minimum cumulative GPA of 2.0 and a minimum GPA of 2.0 for the semester.
- b) For all professional division students in the Pharm.D. program: a minimum cumulative pharmacy core-curriculum GPA of 3.0 and a minimum GPA of 3.0 for the semester.

## Pharmacy Core-Curriculum

Undergraduate core-curriculum courses taught in the College of Pharmacy

beginning in the first year of the professional division:

MBC 3310, 3320, 3550, 3560, 3800, 3850 and 4300

PHCL 3700, 3720, 4150, 4700 and 4720

PHPR 3010, 3070, 3080, 3510, 3940, 4400, 4410, 4420, 4430, 4440, 4450 and 4520

Post-B.S.P.S. core-curriculum courses taught in the College of Pharmacy beginning in the first year of the post- bachelor of science in pharmaceutical sciences portion of the program:

PHCL 5140

PHPR 6160, 6210, 6230, 6240, 6250, 6370, 6380, 6420, 6430, 6440, 6490, 6510, 6550, 6610, 6940, 8260, 8390, 8470, 8480, 8500, 8620 and 8630

## Experiential Performance Standards

Any student who fails to pass a single clerkship rotation or is dismissed from a single clerkship rotation (for reasons other than an action detrimental to patient care and/or to the clinical service) will be placed on academic probation immediately upon completion or dismissal from the rotation. The student will continue on academic probation for the duration of his/her clerkship rotation experience.

Any student on probation who fails to pass a clerkship rotation or is dismissed from a clerkship rotation will be immediately removed from the clerkship program, receive a record review by the academic performance committee, and be subject to dismissal from the doctor of pharmacy program. All previously scheduled clerkship sites will become available for other clerkship students.

If the situation leading to the dismissal of a student from a clerkship rotation is related to an action that is detrimental to patient care and/or the clinical service, the student will be immediately removed from the clerkship program. The academic performance committee will review the situation, and the student may be subject to dismissal from the doctor of pharmacy program. All previously scheduled clerkship sites will become available for other clerkship students.

Actions that are subject to dismissal are outlined in the Experiential Dismissal Policy.

## Experiential Dismissal Policy

Pharmacy students may be dismissed from a clerkship site at any time during the rotation by the clerkship site and/or preceptor through the initiation of the dismissal procedure described below.

### Actions Subject to Dismissal

Following are circumstances or actions under which clerkship students may be dismissed using the dismissal procedure described below:

- \* Failure to adhere to clerkship site policy and/or procedure.
- \* Failure to adhere to UT clerkship program policy and/or procedure.
- \* Failure to meet a UT clerkship program requirement.

\* Blatantly unacceptable or continuously unacceptable clerkship program performance.

\* Mistreatment of UT and/or clerkship site employees.

\* The performance of an action that is detrimental to the care of a patient.

\* The performance of an action that is detrimental to the clinical service provided by the site and/or preceptor.

## Dismissal Procedure

When a circumstance or action that is determined to be grounds for dismissal occurs, the clerkship preceptor will inform the student and director of experiential programs of the situation. The situation will then be handled as follows:

- a) If the situation is related to failure to meet a requirement, failure to follow policy or procedure, improper behavior or inadequate clerkship performance, the student will be given a specific outline by the clerkship preceptor as to how his/her performance must improve and/or meet expectations within five class days. A copy of this outline will be sent to the director of experiential programs. If after five class days such performance has not been achieved, the student will be removed from the clerkship site and will receive either a grade of U or IN as determined by the director of experiential programs.
- b) If the situation is related to an action that is detrimental to patient care and/or to the clinical service, upon discussion of the situation between the clerkship preceptor and clinical coordinator, the student shall be subject to immediate removal from the clerkship site and shall receive a grade of U.

If a student has any question over the handling of his/her dismissal procedure by the director of experiential programs and/or preceptor, he/she should contact the chair of the department of pharmacy practice.

## Student Grievances

Student complaints specifically related to Accreditation Council for Pharmacy Education (ACPE) standards should be submitted on the appropriate form to the College of Pharmacy Office of Student Affairs (Wolfe Hall Room 1227) in care of the associate dean for student affairs. Forms and a copy of the ACPE standards are available in the Office of Student Affairs. Students can also find the ACPE standards at the following Web site: [www.acpe-accredit.org/standards/default.asp](http://www.acpe-accredit.org/standards/default.asp).

Student issues or complaints regarding specific courses should be resolved via discussion with the course instructor. If further resolution is required, the departmental chair should be consulted. Refer to the Academic Grievance section in the General Section of this catalog for further information.

## College Level Examination Program Credit (CLEP)

The College of Pharmacy grants up to a maximum of 30 semester CLEP credits. Credits earned in the natural sciences and mathematics section of the CLEP examination will count toward the degree as free electives, but do not replace the requirement for any specific course in biology, chemistry, physics or mathematics. Credits earned in the humanities and social sciences examination will count only toward meeting the additional humanities and social science requirements.

## Credit by Exam

Refer to the General Section of this catalog for Credit by Exam policies that apply to all students.

## Criteria for Class Standing in the College of Pharmacy

### Year Criteria

- First Earned less than 30 semester hours.
- Second Earned at least 30 semester hours, have a higher education GPA (as previously defined) of 2.5 or greater (based on the point average scale of A equaling 4.0) and enrolled for or completed organic chemistry, physics and functional anatomy and pathophysiology.
- Third Earned at least 63 semester hours and officially accepted into the professional division.

Note: The student is responsible for the correct selection of the program of study each semester and for the fulfillment of the requirements given here. Although advisers will assist wherever possible, the final responsibility rests with the student. The College of Pharmacy reserves the right to change its policies and procedures at any time. These changes will be binding on the date they are approved by faculty action. Courses taken at other colleges of pharmacy will not substitute for professional division courses. The only pharmacy courses a preprofessional student is permitted to take through the College of Pharmacy are PHPR 1000 and 2010, and PHCL 2220, 2600 and 2620. Only students admitted to the professional division will be allowed to take 3000- or 4000-level courses in the college.

## Degree Requirements

The curriculum as outlined in the current catalog is subject to modifications with immediate implementation to keep pace with changing trends in pharmaceutical education and in accordance with accreditation standards.

## Bachelor of Science in Pharmaceutical Sciences Degree Requirements

In response to the increasing demand for scientists, researchers, administrators, and professional sales representatives in the pharmaceutical fields, The University of Toledo College of Pharmacy offers the bachelor of science in pharmaceutical sciences degree program as one of the first in Ohio and one of the few in the nation. The bachelor of science in pharmaceutical sciences degree is a four-year baccalaureate program. Pharmaceutical sciences represent the collective basic sciences that underlie pharmacy. There are four majors under this degree program – medicinal and biological chemistry, pharmacology/toxicology, pharmaceuticals and pharmacy administration.

This degree program is designed for students who wish to pursue careers related to the pharmaceutical industry, pharmaceutical science and research, pharmaceutical administration and sales, the biomedical industry, forensic science, as well as health-care administration. It also prepares students to pursue medical school, law school or graduate studies. The degree that prepares students for professional practice and licensure is the doctor of pharmacy (Pharm.D.) degree.

## General Program Requirements

A total of 132 semester hours are required for graduation with all the bachelor of science in pharmaceutical sciences non-Pharm.D. majors.

## Preprofessional Division Requirements

In the preprofessional division, the first two years of the bachelor of science in pharmaceutical sciences program, students will be broadly trained in the arts, humanities and social sciences – although the natural sciences will receive emphasis. The curriculum of the preprofessional division of the College of Pharmacy is the same for the Pharm.D. and the bachelor of science in pharmaceutical sciences degrees.

### First Year

#### First Semester

BIOL	2150	Fundamentals of Life Sci. I.....	4
BIOL	2160	Fundamentals of Life Sci. Lab I.....	1
CHEM	1230	General Chemistry I.....	4
CHEM	1280	General Chemistry Lab I.....	1
MATH	1750	Calculus for the Life Sciences I.....	4
PHPR	1000	Orientation.....	1
		UT Core Requirement (ENGL 1110)*.....	3

#### Second Semester

BIOL	2170	Fundamentals of Life Sci. II.....	4
BIOL	2180	Fundamentals of Life Sci. Lab II.....	1
CHEM	1240	General Chemistry II.....	4
CHEM	1290	General Chemistry Lab II.....	1
MATH	1760	Calculus for the Life Sciences II.....	3
		UT Core Requirement (ENGL 1130 or equivalent)*.....	3

### Second Year

#### First Semester

CHEM	2410	Organic Chemistry I.....	3
CHEM	2460	Organic Chemistry Lab I.....	1
PHCL	2600	Funct. Anat. & Pathophysiology I.....	4
PHPR	2010	Intro to Patient Care.....	2
PHYS	1750	Introduction to Physics or equiv.....	4
		UT Core Requirement (PSY 1010 or SOC 1010)*.....	3

#### Second Semester

CHEM	2420	Organic Chemistry II.....	3
CHEM	2470	Organic Chemistry Lab II.....	1
PHCL	2620	Funct. Anat. & Pathophysiology II.....	4
		UT Core Requirement (ECON 1200)*.....	3
		UT Core Requirement (Humanities/Fine Arts)*.....	3
		UT Core Requirement (Humanities/Fine Arts)**.....	3

\* Suggested sequence

\*\* Select a course that will simultaneously fulfill a UT multicultural studies Core Curriculum requirement.

## Bachelor of Science in Pharmaceutical Sciences Professional Division Requirements

In the professional division of the bachelor of science in pharmaceutical sciences degree program, the last two years of the program, advanced courses of study and practicum in each major lead to a unique concentration in the pharmaceutical fields. Admission requirements are listed under General Criteria for Admission to the professional divisions.

### Medicinal and Biological Chemistry Major

Medicinal and biological chemistry is an interdisciplinary science. This major focuses on synthetic organic chemistry, biochemistry, molecular biology, biotechnology, pharmacology and pharmaceutical chemistry underlying the design, synthesis and development of drugs.

*Career Opportunities:* Professional chemists are in demand in industry, education, business, research organizations and the public sector. Students

graduating from this major will be ideal for a variety of careers, such as drug analysts, research chemists, technical writers, sales representatives, biochemistry technical officers and forensic scientists. Employers include large and small pharmaceutical companies, biotechnology companies, hospital laboratories, government laboratories and the chemical industry. The broad base on which the major is structured does not limit employment to pharmaceutical or biotechnology options and allows students to compete for positions requiring a knowledge of chemistry, such as in the petrochemical industry, wine industry, polymer industry, paint industry, etc. Graduates also are able to move on to graduate programs in the field, medical school or other professional schools.

## Medicinal and Biological Chemistry Professional Division Curriculum

### Third Year

#### First Semester

MBC	3310	Medicinal Chemistry I	3
MBC	3550	Physiological Chemistry I	3
or			
CHEM	3510	Biochemistry I	3
PHCL	3700	Pharmacology I	3
Major Elective (Recommend MBC 3880) <sup>1</sup>			
Major Elective (Recommend CHEM 3310) <sup>1</sup>			
Major Elective (Recommend CHEM 3710) <sup>1</sup>			

#### Second Semester

MBC	3320	Medicinal Chemistry II	3
MBC	3560	Physiological Chemistry II	3
or			
CHEM	3520	Biochemistry II	3
PHCL	3720	Pharmacology II	3
Major Elective (Recommend CHEM 3360) <sup>1</sup>			
Major Elective (Recommend MBC 3880 or CHEM 3720) <sup>1</sup>			
UT Core Requirement (Multicultural Studies)*			

### Fourth Year

#### First Semester

MBC	4710	Targeted Drug Design (fall)	or
MBC	4720	Advances in Drug Design (spring)	3
Major Elective (Recommend MBC 4880, or 4850, or 4870) <sup>1</sup>			
Major Elective <sup>1</sup>			
Major Elective <sup>1</sup>			
Major Elective <sup>1</sup>			
Major Elective <sup>1</sup>			

#### Second Semester

MBC	4780	Practicum in Med. & Biol. Chem. <sup>2</sup>	6-12
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<sup>1</sup> Electives to be chosen with faculty adviser from the MBC electives list.

<sup>2</sup> Practicum can, as an alternative, be taken in the summer before the fourth year, allowing the student to graduate a semester earlier. If the practicum is taken in the fall of the fourth year, the listed courses will be taken in the spring. The practicum sites require students to have an average GPA of 3.0 in all chemistry courses (CHEM and MBC).

\*Suggested sequence

## MBC Electives

A total of 25 hours of course work must be selected from the list of elective courses below.

BIOL	3010	Molecular Genetics	3
BIOL	3020	Molecular Genetics - Lab	2
BIOL	3030	Cell Biology	3
BIOL	3040	Cell Biology Lab	2
BIOL	4010	Molecular Biology	3
BIOL	4030	Microbiology	3
BIOL	4050	Immunology	3
BIOL	4110	Human Genetics	3
BIOL	4330	Parasitology	3
CHEM	3310	Analytical Chemistry	2
CHEM	3360	Analytical Chemistry Lab	2
CHEM	3610	Inorganic Chemistry	3
CHEM	3710	Physical Chemistry for the Biosciences I	3
CHEM	3720	Physical Chemistry for the Biosciences II	3
CHEM	3730	Physical Chemistry I	3
CHEM	3740	Physical Chemistry II	3
CHEM	3860	Advanced Laboratory I	3
CHEM	3870	Advanced Laboratory II	3
CHEM	4300	Instrumental Analysis	2
CHEM	4620	Inorganic Chemistry II	3
CHEM	4880	Advanced Laboratory III	2
CHEM	4980	Advanced Organic Chemistry	2
MBC	3800	Microbiology & Immunology	3
MBC	3880	Medicinal & Biological Chem Lab	1-4
MBC	4300	Chemotherapy and Immunotherapy	3
MBC	4420	Neuroscience	2
MBC	4430	Biochemistry of Disease	2
MBC	4450	New Drug Development	2
MBC	4470	Advanced Immunotherapeutics	2
MBC	4480	Chemical Defense Mechanisms in Plants	2
MBC	4710	Targeted Drug Design	3
MBC	4720	Advances in Drug Design	3
MBC	4760	Biochemical Toxicology	2
MBC	4770	Molecular Modeling in Drug Design	3
MBC	4800	Quantitative Structure Activity Relationships	2
MBC	4850	Adv Immunology & Tissue Culture Lab	1-10
MBC	4870	Biomedical Chem Lab	1-10
MBC	4880	Medicinal Biotech Lab	1-10
MBC	4900	Hrs Seminar in Medic/Bio Chem	1-3
MBC	4910	Problems in Bio-medicinal Chem	1-3
MBC	4950	Research in Medicinal Chemistry	6-8
MBC	4950	Research in Medicinal Chemistry – Honors	6-8
MBC	4960	Hrs Thesis in Medicinal Chem	2-5
MBC	4980	Special Topics in Drug Design	1-4
PHCL	4140	Interpretation of Pharmaceutical Data	3
PHCL	4150	Biopharmaceutics/Pharmacokinetics	4
PHCL	4700	Pharmacology III	3
PHCL	4720	Pharmacology IV	3
PHCL	4730	Toxicology I	3
PHCL	4750	Toxicology II	3
PHCL	4760	Toxicokinetics	3
PHCL	4770	Toxicological Risk Assessment	3
PHCL	4800	Human-Xenobiotic Interactions	3
PHCL	4850	Drug Disposition	2

## Pharmaceutics Major

Pharmaceutics is a multidisciplinary applied science that studies the physical and chemical attributes of drugs. It places a strong emphasis on the design and evaluation of drug delivery systems and dosage forms and also on the understanding and control of the factors influencing clinical response to drug therapy.

*Career Opportunities:* The breadth and depth of the program prepare students for a wide range of career opportunities. Graduates can work as drug analysts, manufacturing/production technologists, quality control inspectors, technical writers, sales representatives and research associates



in the pharmaceutical industry, cosmetic industry, hospitals and university settings. Graduates also can move on to graduate studies in the field, medical school or other professional school.

## Pharmaceutics Professional Division Curriculum

### Third Year

#### First Semester

MBC	3310	Medicinal Chemistry I	3
MBC	3550	Physiological Chemistry I	3
PHCL	3700	Pharmacology I	3
PHPR	3010	Pharmaceutical Calculations	2
PHPR	3070	Pharmaceutics I	4

#### Second Semester

MBC	3320	Medicinal Chemistry II	3
MBC	3560	Physiological Chemistry II	3
MBC	3800	Microbiology & Immunology	3
PHCL	3720	Pharmacology II	3
PHPR	3080	Pharmaceutics II	4

#### Summer between Third and Fourth Year

PHPR	4880	Practicum in Pharmaceutics	6-12
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### Fourth Year

#### First Semester

CHEM	3310	Analytical Chemistry	2
PHCL	4150	Biopharmaceutics & Pharmacokinetics	4
PHCL	4700	Pharmacology III	3
		Pharmaceutical Electives <sup>1</sup>	2-3
		UT Core Requirement (Multicultural Studies)*	3

#### Second Semester

BIOL	3030	Cell Biology	3
BIOL	3040	Cell Biol. Lab	2
CHEM	3360	Analytical Chemistry Lab	2
PHCL	4720	Pharmacology IV	3
		General Electives <sup>2</sup>	2-4

<sup>1</sup> To be chosen from the pharmaceutics electives list below.

<sup>2</sup> To be chosen from the general electives list below.

\* Suggested sequence

## PHAR Electives

### Pharmaceutics Electives (at least 2 hours)

PHPR	4010	Modern Drug Delivery	2
PHPR	4250	Sterile Products	2
PHPR	4680	Parenteral Manufacturing*	2
PHPR	4690	Dosage Form Design*	3
PHPR	4710	Selected Topics in Pharm. Tech.*	2
PHPR	4720	Pharmaceutical Rate Process*	2
PHPR	4900	Honors Seminar Pharmaceutics	3
PHPR	4910	Pharmacy Practice Problems	1-3
PHPR	4960	Honors Thesis Pharmacy Practice	5

### General Electives (at least 2 hours)

BIOL	3010	Molecular Genetics	3
BIOL	3020	Molecular Genetics Lab	2
BIOL	4110	Human Genetics	3
BIOL	4330	Parasitology	3
CHEM	3710	Physical Chemistry for Bioscience I	3
CHEM	3720	Physical Chemistry for Bioscience II	3
CHEM	3730	Physical Chemistry I	3
CHEM	3740	Physical Chemistry II	3
CHEM	4300	Instrumental Analysis	2

CHEM	4880	Advanced Laboratory III	2
ECON	4750	Health Economics	3
MBC	4390	Genes and Proteins in Therapy	2
MBC	4450	New Drug Development	2
PHCL	4140	Interpretation of Pharmaceutical Data	3
PHCL	4850	Drug Disposition	2

\*Taught every other year for those undergraduates not planning to apply to UT's industrial pharmacy graduate program.

## Pharmacology/Toxicology Major

Pharmacology and toxicology are biomedical sciences that study how to develop safe, effective drugs and prevent the harmful effects of chemicals. Pharmacology focuses on the way drugs interact with various living systems, including the properties, effects and mechanisms of drug action. Toxicology focuses on the interaction of toxic compounds in the body, including exposure assessment, dose response assessment and hazard identification.

**Career Opportunities:** This major prepares students to work as pharmacologists and toxicologists in the biomedical industry, pharmaceutical industry, nutritional industries, environmental conservation and pollution control, scientific civil service, governmental agencies, forensic sciences and research institutes. Graduates can also work as sales representatives or move on to graduate studies in the field, medicine, veterinary medicine and in most biomedical fields.

## Pharmacology/Toxicology Professional Division Curriculum

### Third Year

#### First Semester

MBC	3310	Medicinal Chemistry I	3
MBC	3550	Physiological Chemistry I	3
PHCL	3700	Pharmacology I	3
		Major Elective (Recommend PHCL 4730) <sup>1</sup>	3
		Major Electives (Recommend BIOL 3010 & 3020) <sup>1</sup>	5-6

#### Second Semester

MBC3320	Medicinal Chemistry II	3	
MBC3560	Physiological Chemistry II	3	
PHCL	3720	Pharmacology II	3
PHCL	3810	Pharmacology & Toxicology Lab <sup>2</sup>	1
		Major Elective (Recommend PHCL 4750) <sup>1</sup>	3
		UT Core Requirement (Multicultural Studies)*	3

### Fourth Year

#### First Semester

MBC	4710	Targeted Drug Design (fall)	or
MBC	4720	Advances in Drug Design (spring)	3
PHCL	4700	Pharmacology III	3
		Major Elective <sup>1</sup>	3
		Major Elective <sup>1</sup>	3
		Major Elective <sup>1</sup>	3
		Major Elective <sup>1</sup>	3

#### Second Semester

PHCL	4780	Practicum in Pharmacology/Toxicology <sup>3</sup>	6-12
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1 To be chosen with faculty adviser from the PTOX electives list.

2 Required for practicum and only offered in spring.

3 If the practicum is completed in the summer before the fourth year, the student can graduate a semester earlier.

\* Suggested sequence

## PTOX Electives

A total of 24 hours of course work must be selected from the list of elective courses below.

BIOL	3010	Molecular Genetics	3
BIOL	3020	Molecular Genetics - Lab	2
BIOL	3030	Cell Biology	3
BIOL	3040	Cell Biology Lab	2
BIOL	4010	Molecular Biology	3
BIOL	4030	Microbiology	3
BIOL	4050	Immunology	3
BIOL	4110	Human Genetics	3
BIOL	4330	Parasitology	3
CHEM	3310	Analytical Chemistry	2
CHEM	3360	Analytical Chemistry Lab	2
CHEM	3710	Physical Chemistry for the Biosciences I	3
CHEM	3720	Physical Chemistry for the Biosciences II	3
CHEM	3730	Physical Chemistry I	3
CHEM	3740	Physical Chemistry II	3
CHEM	4300	Instrumental Analysis	2
CHEM	4880	Advanced Laboratory III	2
MATH	2600	Introduction to Statistics	3
MBC	3800	Microbiology & Immunology	3
MBC	4300	Chemotherapy and Immunotherapy	3
MBC	4340	Contemporary Natural Remedies	2
MBC	4410	Nutrition in Health and Disease	2
MBC	4420	Neuroscience	2
MBC	4430	Biochemistry of Disease	2
MBC	4450	New Drug Development	2
MBC	4470	Advanced Immunotherapeutics	2
MBC	4480	Chemical Defense Mechanisms in Plants	2
MBC	4710	Targeted Drug Design	3
MBC	4720	Advances in Drug Design	3
MBC	4760	Biochemical Toxicology	2
MBC	4770	Molecular Modeling in Drug Design	3
MBC	4800	Quantitative Structure Activity Relationships	2
MBC	4880	Medicinal Biotech Lab	1-10
MBC	4980	Special Topics in Drug Design	1-4
PHCL	4140	Interpretation of Pharmaceutical Data	3
PHCL	4150	Biopharmaceutics/Pharmacokinetics	4
PHCL	4300	Selected Topics in Pharmacology	2
PHCL	4630	Cancer Chemotherapy	3
PHCL	4710	Pharmacology – Toxicology Seminar	3
PHCL	4720	Pharmacology IV	3
PHCL	4730	Toxicology I	3
PHCL	4750	Toxicology II	3
PHCL	4760	Toxicokinetics	3
PHCL	4770	Toxicological Risk Assessment	3
PHCL	4800	Human-Xenobiotic Interactions	3
PHCL	4850	Drug Disposition	2
PHCL	4900	Hnrs Seminar Pharmacology/Toxicology	3
PHCL	4910	Problems in Pharmacology/Toxicology	1-3
PHCL	4960	Honors Thesis Pharmacology/Toxicology	5

## Pharmacy Administration Major

Pharmacy administration focuses on the corporate and managerial aspects of the pharmacy profession. Students earn a minor in business administration, or professional sales, or both in addition to the bachelor of science in pharmaceutical sciences degree. The business minor options under this major are as follows: business administration, professional sales, business administration and professional sales, business administration and M.B.A. track, and professional sales/business administration and M.B.A. track. With one year of additional graduate study, students in the two M.B.A. track options could receive a master of business administration degree.

*Career Opportunities:* Pharmaceutical sales is one of the fastest growing careers in the country. The pharmacy administration major prepares students for careers in pharmaceutical sales, and management positions in the pharmaceutical industry, corporate and retail pharmacy offices, pharmacy education, government agencies and health care administration. Students are encouraged to pursue graduate studies in business or pharmacy administration.

## Pharmacy Administration Major Professional Division Curriculum:

There are five options for this major.

### Business Administration Minor Option

#### Third Year

##### First Semester

BUAD	1020 or CMPT	1100 or placement <sup>1</sup>	0-3
BUAD	2060 or MATH	2630 or 2600 or equiv.	3
ECON	1150	Principles of Macroeconomics	3
MBC	3310	Medicinal Chemistry I	3
MBC	3550	Physiological Chemistry I	3
PHCL	3700	Pharmacology I	3

##### Second Semester

BUAD	2040 or ACTG	1040. <sup>2</sup>	3
BUAD	3010	Principles of Marketing <sup>2</sup>	3
MBC	3320	Medicinal Chemistry II	3
MBC	3560	Physiological Chemistry II	3
PHCL	3720	Pharmacology II	3

##### Summer Between Third and Fourth Years

PHPR	4780	Practicum in Pharmacy Administration	6-12
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#### Fourth Year

##### First Semester

BUAD	2050 or ACTG	1050 <sup>2</sup>	3
BUAD	3030	Manage. & Behav. Process in Orgs <sup>2</sup>	3
BUAD	3040	Prin. of Financial Management <sup>2</sup>	3
PHCL	4700	Pharmacology III	3

##### Second Semester

PHPR	4550	Analysis of Pharm. Environment <sup>3</sup>	3
Business Minor Elective <sup>4</sup>			3
Business Elective (choose any business course)			3
UT Core Requirement (Multicultural Studies)*			3

<sup>1</sup> This requirement will be waived with a passing score on the microcomputer placement test, which is available at [www.business.utoledo.edu](http://www.business.utoledo.edu).

<sup>2</sup> A grade of C or higher is required for the minor.

<sup>3</sup> PHPR 4520 or MKTG 3880 or 4540 may be taken as an alternative.

<sup>4</sup> Choose from business administration minor requirements listed by the College of Business Administration.

\* Suggested sequence

## Professional Sales Minor Option

#### Third Year

##### First Semester

BUAD	2060 or MATH	2630 or 2600 or equiv.	3
ECON	1150	Principles of Macroeconomics	3
MBC	3310	Medicinal Chemistry I	3
MBC	3550	Physiological Chemistry I	3
PHCL	3700	Pharmacology I	3

*Second Semester*

BUAD	2040 or ACTG 1040	.....	3	
BUAD	3010	Principles of Marketing <sup>1</sup>	.....	3
MBC	3320	Medicinal Chemistry II	.....	3
MBC	3560	Physiological Chemistry II	.....	3
PHCL	3720	Pharmacology II	.....	3

*Summer Between Third and Fourth Years*

PHPR	4780	Practicum in Pharmacy Administration	.....	6-12
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**Fourth Year***First Semester*

BUAD	2050 or ACTG 1050	.....	3	
BUAD	3030	Manage. & Behav. Process in Orgs.	.....	3
PHCL	4700	Pharmacology III	.....	3
PSLS	3440	Sales <sup>1</sup>	.....	3
PSLS	3450	Acct. & Territory Management <sup>1</sup>	.....	3

*Second Semester*

BUAD	3040	Prin. of Financial Management	.....	3
PHPR	4550	Analysis of Pharm. Environment <sup>2</sup>	.....	3
PSLS	3080	Purch. & Busi. Rela. Mgmt <sup>1</sup>	.....	<i>or</i>
PSLS	4710	Sales Force Leadership <sup>1</sup>	.....	3
PSLS	4740	Advanced Sales <sup>1</sup>	.....	3
UT Core Requirement (Multicultural Studies)*				3

<sup>1</sup> A grade of C or higher is required for the minor.<sup>2</sup> PHPR 4520 or MKTG 3880 or 4540 may be taken as an alternative.

\* Suggested sequence

**Business Administration Minor and Professional Sales Minor Option****Third Year***First Semester*

BUAD	2060 or MATH 2630 or 2600 or equiv.	.....	3	
CMPT	1100	or equiv or placement test <sup>1</sup>	.....	0-3
ECON	1150	Principles of Macroeconomics	.....	3
MBC	3310	Medicinal Chemistry I	.....	3
MBC	3550	Physiological Chemistry I	.....	3
PHCL	3700	Pharmacology I	.....	3

*Second Semester*

BUAD	2040 or ACTG 1040 <sup>2</sup>	.....	3	
BUAD	3010	Principles of Marketing <sup>2</sup>	.....	3
MBC	3320	Medicinal Chemistry II	.....	3
MBC	3560	Physiological Chemistry II	.....	3
PHCL	3720	Pharmacology II	.....	3

*Summer Between Third and Fourth Years*

PHPR	4780	Practicum in Pharmacy Administration	.....	6-12
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**Fourth Year***First Semester*

BUAD	2050 or ACTG 1050 <sup>2</sup>	.....	3	
BUAD	3030	Manage. & Behav. Process Orgs <sup>2</sup>	.....	3
PHCL	4700	Pharmacology III	.....	3
PSLS	3440	Sales <sup>2</sup>	.....	3
PSLS	3450	Account & Territory Management <sup>2</sup>	.....	3

*Second Semester*

BUAD	3040	Prin. of Financial Management <sup>2</sup>	.....	3
PHPR	4550	Analysis of Pharm. Environment <sup>3</sup>	.....	3

PSLS	3080	Purch. & Busi. Rela. Mgmt <sup>2</sup>	.....	<i>or</i>
PSLS	4710	Sales Force Leadership <sup>2</sup>	.....	3
PSLS	4740	Advanced Sales <sup>2</sup>	.....	3
Non-western Multicultural Studies* (IBUS 3150) <sup>4</sup>				3

<sup>1</sup> This requirement will be waived with a passing score on the microcomputer placement test, which is available at [www.business.utoledo.edu](http://www.business.utoledo.edu).<sup>2</sup> A grade of C or higher is required for the minors.<sup>3</sup> PHPR 4520 or MKTG 3880 or 4540 may be taken as an alternative.<sup>4</sup> If IBUS 3150 is not taken for nonwestern multicultural studies, students should take BUAD 2070 for the double minors.

\* Suggested sequence

**Business Administration Minor & M.B.A. Track Option<sup>1</sup>****Third Year***First Semester*

BUAD	1020 or CMPT 1100 or placement <sup>2</sup>	.....	0-3	
BUAD	3030	Manage. & Behav. Process in Orgs.	.....	3
ECON	1150	Principles of Macroeconomics	.....	3
MBC	3310	Medicinal Chemistry I	.....	3
MBC	3550	Physiological Chemistry I	.....	3
PHCL	3700	Pharmacology I	.....	3

*Second Semester*

BUAD	2040 or ACTG 1040	.....	3	
BUAD	2060 or MATH 2630 or 2600 or equiv.	.....	3	
BUAD	3010	Principles of Marketing	.....	3
MBC	3320	Medicinal Chemistry II	.....	3
MBC	3560	Physiological Chemistry II	.....	3
PHCL	3720	Pharmacology II	.....	3

*Summer Between Third and Fourth Years*

PHPR	4780	Practicum in Pharmacy Administration	.....	6-12
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**Fourth Year***First Semester*

BUAD	2050 or ACTG 1050	.....	3	
BUAD	2070	Appl. of Stats in Bus Deci. Making	.....	3
BUAD	3010	Principles of Marketing	.....	3
PHCL	4700	Pharmacology III	.....	3

*Second Semester*

BUAD	3020	Principles of Mfg. & Service Systems	.....	3
BUAD	3040	Prin. of Financial Management	.....	3
PHPR	4550	Analysis of Pharm. Environment	.....	<i>or</i>
PHPR	4520	Pharmacy Management & Marketing	.....	<i>or</i>
MKTG	3880	Mktg. Rsch. & Data-Based Mgmt.	.....	<i>or</i>
MKTG	4540	Business Marketing	.....	3
UT Core Requirement (Multicultural Studies)*				3

<sup>1</sup> This track will enable students to fulfill the prerequisites for the M.B.A. program with grades of C (2.0) or higher in all BUAD courses listed in this curriculum.

To be admitted to the M.B.A. program in the College of Business Administration, students must successfully complete the GMAT prior to application. Students who have satisfied all graduate admissions requirements and prerequisites will complete 33 semester hours at the 6000 graduate level for the M.B.A. at The University of Toledo.

<sup>2</sup> This requirement will be waived with a passing score on the microcomputer placement test, which is available at [www.business.utoledo.edu](http://www.business.utoledo.edu).

\* Suggested sequence

## Professional Sales/Business Administration Minors and M.B.A. Track Option<sup>1</sup>

### Third Year

#### First Semester

BUAD	3030	Manage. & Behav. Process in Orgs.....	3
CMPT	1100	or equiv or placement test <sup>2</sup> .....	0-3
ECON	1150	Principles of Macroeconomics .....	3
MBC	3310	Medicinal Chemistry I .....	3
MBC	3550	Physiological Chemistry I.....	3
PHCL	3700	Pharmacology I.....	3

#### Second Semester

BUAD	2040 or ACTG 1040.....	3
BUAD	2060 or MATH 2630 or 2600 or equiv.....	3
BUAD	3010 Principles of Marketing.....	3
MBC	3320 Medicinal Chemistry II.....	3
MBC	3560 Physiological Chemistry II .....	3
PHCL	3720 Pharmacology II.....	3

#### Summer Between Third and Fourth Years

PHPR	4780	Practicum in Pharmacy Administration .....	6-12
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### Fourth Year

#### First Semester

BUAD	2050 or ACTG 1050.....	3
BUAD	2070 Appl. of Stats in Bus Decision-making .....	3
PHCL	4700 Pharmacology III .....	3
PSLS	3440 Sales .....	3
PSLS	3450 Acct & Territory Management.....	3

#### Second Semester

BUAD	3040 Prin. of Financial Management.....	3
PHPR	4550 Analysis of Pharm. Environment <sup>3</sup> .....	3
PSLS	3080 Purch. & Busi. Rela. Mgmt.....	or
PSLS	4710 Sales Force Leadership .....	3
PSLS	4740 Advanced Sales.....	3
UT Core Requirement (Multicultural Studies)* .....		3

<sup>1</sup> This track will enable students to fulfill most of the prerequisites for the M.B.A. program, except one course BUAD 3020, with grades of C (2.0) or higher in all BUAD and PSLS courses listed in this curriculum. To be admitted to the M.B.A. program in the College of Business Administration, students must successfully complete the GMAT prior to application. Students who have satisfied all graduate admissions requirements and prerequisites will complete 33 semester hours at the 6000 graduate level for the M.B.A. at The University of Toledo.

<sup>2</sup> This requirement will be waived with a passing score on the microcomputer placement test, which is available at [www.business.utoledo.edu](http://www.business.utoledo.edu).

<sup>3</sup> PHPR 4520 may be taken as an alternative.

\* Suggested sequence

Note: The student is responsible for the correct selection of the program of study each semester and for the fulfillment of the requirements given here. Although advisers will assist wherever possible, the final responsibility rests with the student. The College of Pharmacy reserves the right to change its policies and procedures at any time. These changes will be binding on the date they are approved by faculty action. Courses taken at other colleges of pharmacy will not substitute for professional division pharmacy courses. The only pharmacy courses a preprofessional student is permitted to take through the College of Pharmacy are PHPR 1000 and 2010 and PHCL 2220, 2600 and 2620. Only students admitted to the professional division will be allowed to take 3000- or 4000-level courses in the college.

## B.S.P.S. Practicum Description

All four majors in the bachelor of science in pharmaceutical sciences degree program require real-life workplace practicums in a variety of appropriate settings at local, regional, national and international sites. Most students schedule their practicums in the summer after their third year. Students are generally assigned to ongoing projects at the site and are evaluated on their performance by the project supervisor. A brief paper describing their role in the project is submitted to the coordinator for their major following completion of the practicum.

## Doctor of Pharmacy Degree Requirements

Following admission to the professional division, the entry-level Pharm. D. program students will complete a bachelor of science in pharmaceutical sciences degree prior to more focused course work on pharmacotherapy and pharmaceutical care. Students in the entry-level Pharm.D. track who have completed the bachelor of science in pharmaceutical sciences degree at The University of Toledo are eligible to continue in the Pharm.D. program.

In order to graduate with a Pharm.D. degree, students must meet the current academic performance standards. Only students who successfully complete the Pharm.D. degree will qualify for state board licensure in the practice of pharmacy. A total of 137 semester hours is required for graduation with the bachelor of science in pharmaceutical sciences-Pharm. D. track degree. The curriculum is outlined below.

## Preprofessional Division Requirements

### First Year

#### First Semester

BIOL	2150	Fundamentals of Life Sci. I.....	4
BIOL	2160	Fundamentals of Life Sci. Lab I .....	1
CHEM	1230	General Chemistry I.....	4
CHEM	1280	General Chemistry Lab I.....	1
MATH	1750	Calculus for the Life Sciences I .....	4
PHPR	1000	Orientation .....	1
UT Core Requirement (ENG 1110)* .....			3

#### Second Semester

BIOL	2170	Fundamentals of Life Sci. II .....	4
BIOL	2180	Fundamentals of Life Sci. Lab II .....	1
CHEM	1240	General Chemistry II.....	4
CHEM	1290	General Chemistry Lab II .....	1
MATH	1760	Calculus for the Life Sciences II.....	3
UT Core Requirement (ENG 1130 or equivalent)* .....			3

### Second Year

#### First Semester

CHEM	2410	Organic Chemistry I.....	3
CHEM	2460	Organic Chemistry Lab I.....	1
PHCL	2600	Funct. Anat. & Pathophysiology I.....	4
PHPR	2010	Intro to Patient Care .....	2
PHYS	1750	Introduction to Physics or equiv .....	4
UT Core Requirement (PSY 1010 or SOC 1010)* .....			3

#### Second Semester

CHEM	2420	Organic Chemistry II .....	3
CHEM	2470	Organic Chemistry Lab II .....	1
PHCL	2620	Funct. Anat. & Pathophysiology II .....	4



UT Core Requirement (ECON 1200)*	3
UT Core Requirement (Humanities/Fine Arts)*	3
UT Core Requirement (Humanities/Fine Arts)**	3

\* Suggested sequence

\*\* Select a course that will simultaneously fulfill a UT multicultural studies

Core Curriculum requirement.

## Professional Division Requirements

### Third Year

#### First Semester

MBC 3310	Medicinal Chemistry I	3
MBC 3550	Physiological Chemistry I	3
PHCL 3700	Pharmacology I	3
PHPR 3010	Pharmaceutical Calculations	2
PHPR 3070	Pharmaceutics I	4
PHPR 3510	Pharmaceutic Dimensions of Hlth Care Sys	3

#### Second Semester

MBC 3320	Medicinal Chemistry II	3
MBC 3560	Physiological Chemistry II	3
MBC 3800	Microbiology & Immunology	3
MBC 3850	Microbiology & Immunology Lab	1
PHCL 3720	Pharmacology II	3
PHPR 3080	Pharmaceutics II	4
PHPR 3940	Early Practice Development*	1

### Fourth Year

#### First Semester

MBC 4300	Medicinal Chemistry III	3
PHCL 4150	Biopharmaceutics & Pharmacokinetics	4
PHCL 4700	Pharmacology III	3
PHPR 3940	Early Practice Development*	1
PHPR 4400	Human Interactions in Healthcare	2
PHPR 4410	Professional Practice Development I	3
PHPR 4430	Pathophysiology and Pharmacotherapy: Introduction	1

\* Some students will take PHPR 3940 in the fall; others will take it in the spring.

#### Second Semester

PHCL 4720	Pharmacology IV	3
PHPR 4420	Professional Practice Development II	3
PHPR 4440	PPT: Immunology	2
PHPR 4450	PPT: Renal	3
PHPR 4520	Management and Marketing	3
UT Core requirement (Humanities/Fine Arts)		3

Note: At the end of the fourth year, students are candidates for a B.S. degree in pharmaceutical sciences leading toward a Pharm.D. degree.

### Fifth Year

#### First Semester: Summer Immediately Following Fourth Year

PHCL 5140	Interpretation of Pharm. Data	2
PHPR 6210	Introduction to Research Methods	2
PHPR 6440	PPT: Infectious Disease	4
PHPR 6940	Early Practice Exposure	2
	Graduate Professional Electives*	2-3

(PHPR 6940 will consist of 80 hours of pharmacy practice.)

#### Second Semester: Fall Semester-Fifth Year

#### Second Semester: Fall Semester-Fifth Year

PHPR 6160	Advanced Applied Pharmacokinetics	3
PHPR 6230	Patient Care Rounds I	3
PHPR 6380	PPT: Endocrinology	2
PHPR 6420	PPT: Cardiology	4
PHPR 6430	PPT: Pulmonary	3
PHPR 8470	PPT: Rheumatology	1
	Graduate Professional Electives*	2

#### Third Semester: Spring Semester-Fifth Year

PHPR 6240	Patient Care Rounds II	3
PHPR 6250	Self Care	3
PHPR 6510	PPT: Poison Management	1
PHPR 6550	Management Topics for Clinical Practice	2
PHPR 6610	Seminar I	1
PHPR 8390	PPT: Gastroenterology	2
PHPR 8480	PPT: Neurology and Psychiatry	3
	Graduate Professional Electives*	2-3

### Sixth Year

#### Fourth Semester: Summer Immediately Following Fifth Year

PHPR 6370	PPT: Critical Care/Nutrition	1
PHPR 6490	PPT: Hematology/Oncology	3
PHPR 8260	Jurisprudence & Ethics for Pharmacy	1
PHPR 8500	PPT: Geriatrics and Pediatrics	2
PHPR 8620	Seminar II	1
PHPR 8640	PPT: Capstone	2
	Graduate Professional Electives*	2-3

\* A total of 5 credit hours of Graduate Professional Electives is required

#### Fifth Semester: Fall Semester-Sixth Year

PHPR 8630	Seminar III	2
PHPR 8940:001	Clerkship I	4
PHPR 8940:002	Clerkship II	4
PHPR 8940:003	Clerkship III	4
PHPR 8940:004	Clerkship IV	4

#### Sixth Semester: Spring Semester-Sixth Year

PHPR 8940:005	Clerkship V	4
PHPR 8940:006	Clerkship VI	4
PHPR 8940:007	Clerkship VII	4
PHPR 8940:008	Clerkship VIII	4

Note: At the end of the sixth year, students are candidates for a Pharm.D. degree.

## Pharm.D. Professional Electives

The following is a list of recommended professional electives. Other electives may be chosen with the written approval of a faculty adviser.

### MBC

MBC 5100/7100	Research Practices in Medicinal Chemistry	1
MBC 5380	Medicinal & Poisonous Plants	3
MBC 5620/7620	Biochemical Techniques	2
MBC 6100/8100	Advanced Immunology	2
MBC 6190/8190	Advanced Medicinal Chemistry	4
MBC 6200/8200	Biomedical Chemistry	4
MBC 6420	Protein Chemistry/CHEM 6510/8510	2 or 4
MBC 6430/8430	Nucleic Acid Chem/CHEM 6530/8530	2 or 4
MBC 6440/8440	Enzymology/CHEM 6520/8520	2 or 4

MBC	6750/	Bioorganic Chemistry: Chemical	
	8750	Approaches to Enzymes.....	3
MBC	6800/	Methods in Biotechnology.....	3
	8800		

### PHCL

PHCL	5300	Selected Topics in Pharmacology.....	2
PHCL	5630	Cancer Chemotherapy.....	3
PHCL	5730	Toxicology I.....	3
PHCL	5750	Toxicology II.....	3
PHCL	5760	Toxicokinetics.....	3
PHCL	5900	Drug Disposition.....	2
PHCL	5990	Problems in Pharmacology.....	1 to 6
PHCL	6150	Advanced Pharmacokinetics.....	2
PHCL	6600	Seminar in Pharmacology.....	1
PHCL	6770	Toxicological Risk Assessment.....	3

### PHPR - Administration

PHPR	5990	Problems in Pharmacy Practice.....	1 to 6
PHPR	6530	Research Methods in Pharmacy Practice.....	3
PHPR	6600	Seminar in Administrative Pharmacy.....	1
PHPR	6810	Hospital Pharmacy Administration.....	3
PHPR	6820	Selected Topics in Hospital Pharmacy.....	3
PHPR	6830	Advanced Community Pharmacy Administration.....	3
PHPR	6840	Selected Topics in Community Pharmacy.....	3
PHPR	6980	Special Topics.....	1 to 5

### PHPR - Industrial

PHPR	5680	Parenteral Manufacturing.....	2
PHPR	5690	Dosage Form Design.....	3
PHPR	5710	Selected Topics in Pharmaceutical Techniques.....	2 to 3
PHPR	5720	Pharmaceutical Rate Processes.....	3
PHPR	5990	Problems in Pharmacy Practice.....	1 to 6
PHPR	6950	Seminar in Industrial Pharmacy.....	1
PHPR	6980	Special Topics.....	1 to 5

### PHPR - Clinical

PHPR	6980	Special Topics.....	1 to 5
PHPR	8540	Geriatric Monitoring Principles.....	3

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