

# PHARMACOLOGY AND TOXICOLOGY, BS

## REQUIREMENTS

### UNIVERSITY REQUIREMENTS

All undergraduate students must complete both the following Core General Education (Core GenEd) and University Degree and Quality of Work requirements. The requirements below apply to students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution is Summer 2026 or later.

Students whose first term at UW-Madison or whose earliest post-high school college attendance at any institution occurred before Summer 2026 should refer to the archived Guide (<https://guide.wisc.edu/archive/>) for the requirements that apply to them.

### CORE GENERAL EDUCATION (CORE GENED) REQUIREMENTS

Civics & Perspectives 3 credits of Civics & Perspectives coursework.

Communication & Literacy 6 credits of Communication & Literacy coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: <https://go.wisc.edu/qualifyingenglishplacement> (<https://go.wisc.edu/qualifyingenglishplacement/>)

Humanities & Arts 6 credits of Humanities & Arts coursework.

Mathematics & Quantitative Reasoning 6 credits of Mathematics & Quantitative Reasoning coursework. This requirement may be partially satisfied by a qualifying placement test score. More information: <https://go.wisc.edu/qualifyingmathplacement> (<https://go.wisc.edu/qualifyingmathplacement/>)

Natural Science & Wellness Complete both:
 

- 6 credits of Natural Science & Wellness or Natural Science & Wellness + Laboratory coursework.
- one course must be in Natural Science & Wellness + Laboratory coursework.

Social & Behavioral Science 3 credits of Social & Behavioral Science coursework.

Total Credits 30 credits.

For more information see the policy (<https://policy.wisc.edu/library/UW-1095/>).

### UNIVERSITY DEGREE AND QUALITY OF WORK REQUIREMENTS

All undergraduate degree recipients must complete the following minimum requirements. Requirements for some programs will exceed these requirements; see program requirements for additional information.

Total Degree 120 degree credits.

Residency Complete 30 credits in residence. A course is considered "in residence" if it is taken when in undergraduate degree-seeking status and:
 

- is offered by UW-Madison and completed on the UW-Madison campus or at an approved off-site location, or
- is offered by UW-Madison in an online or distance format, or is completed during participation in a UW-Madison study abroad/study away program.

Quality of Work Achieve at least the minimum grade point average specified by the school, college, and/or academic program.

Math Demonstrate minimal mathematics competence by:
 

- placing above MATH 96, or
- successfully completing MATH 96, or
- successfully completing a more advanced mathematics course such as MATH 112, MATH 113, MATH 114, MATH 141, MATH 211, or MATH 221.

English Language If required to take the UW-Madison English as a Second Language Assessment Test (MSN-ESLAT), demonstrate minimal English language competence by:
 

- earning credit for ESL 118, or
- achieving a qualifying MSN-ESLAT placement test score.

Language Complete one:
 

- 2 high school units of a single language other than English, or
- one course with the second semester Language designation.

Major Declaration Declare and complete the requirements for at least one major.

### SCHOOL OF PHARMACY BS REQUIREMENTS

Communication A Complete either:
 

- one course with the Communication A designation, or
- satisfaction of Communication A based on UW Placement Test.

Communication B One course with the Communication B designation.

Quantitative Reasoning A Complete either:
 

- one course with the Quantitative Reasoning A designation, or
- satisfaction of Quantitative Reasoning A based on UW Placement Test.

Quantitative Reasoning B One course with the Quantitative Reasoning B designation.

Ethnic Studies One course with the Ethnic Studies designation.

Natural Science 6 credits with the Biological, Natural, or Physical Science designations.

Social Science 3 credits with the Social Science designation.

Humanities 6 credits with the Humanities, Literature, or Language designations.

School of Pharmacy BS degrees require the following groups of coursework:

- Core General Education
- School of Pharmacy BS Requirements
- Major/prerequisite requirements

Courses can satisfy multiple requirement groups. For example, courses used to fulfill School of Pharmacy BS requirements can also fulfill major requirements and/or Core GenEd requirements. A course can fulfill multiple School of Pharmacy BS requirements if it carries those designations (e.g. Ethnic Studies and Social Science).

## PREREQUISITES

### CALCULUS I

Code	Title	Credits
MATH 221	Calculus and Analytic Geometry 1 <sup>1</sup>	5

<sup>1</sup> MATH 211 Survey of Calculus 1 taken at UW-Madison does not fulfill the Calculus I requirement for this major.

### GENERAL AND ORGANIC CHEMISTRY

Code	Title	Credits
Complete one of the following general chemistry options:		
CHEM 103 & CHEM 104	General Chemistry I and General Chemistry II	9
CHEM 109	Advanced General Chemistry	5
CHEM 115	Chemical Principles I	5
Complete all of the following organic chemistry courses:		
CHEM 343	Organic Chemistry I	3
CHEM 345	Organic Chemistry II	3
CHEM 344	Introductory Organic Chemistry Laboratory	2

### INTRODUCTORY BIOLOGY

Code	Title	Credits
Complete one of the following options:		
BIOLOGY/BOTANY/ ZOOLOGY 151 & BIOLOGY/ BOTANY/ ZOOLOGY 152	Introductory Biology and Introductory Biology	10
BIOLOGY/ ZOOLOGY 101 & BIOLOGY/ ZOOLOGY 102 & BOTANY/ BIOLOGY 130	Animal Biology and Animal Biology Laboratory and General Botany	10
BIOCORE 381 & BIOCORE 382 & BIOCORE 383 & BIOCORE 384	Evolution, Ecology, and Genetics and Evolution, Ecology, and Genetics Laboratory and Cellular Biology and Cellular Biology Laboratory	10

## COMMUNICATION A

The UW-Madison Communication A requirement must be fulfilled.

## SOCIAL SCIENCE

Any course with the "Social Science" breadth designation (3 credits).

## OTHER COLLEGE COURSES

Sixty (60) credits must be completed by the end of the summer semester prior to entering the program. AP, IB, retrocredits, and credit-granting transfer coursework from other institutions (including coursework completed while in high school) all count toward the 60 credits.

## PHARMACOLOGY AND TOXICOLOGY MAJOR REQUIREMENTS

**Once you are admitted to the major, it will take two years/four semesters to finish the major/degree requirements.** There are no exceptions to shorten this timeline, though you can extend your time if needed. Most of the major-level courses follow a set order due to prerequisites and some classes only being offered in fall or spring. To stay on track, it's very important to follow the four-year plans (<https://guide.wisc.edu/undergraduate/pharmacy/pharmacy/pharmacology-toxicology-bs/#fouryearplante>). Missing a critical course could delay graduation.

You may be able to take some major-level courses early if you meet the prerequisites, but this will **not** allow you to graduate in fewer than four semesters after admission.

Some requirements (such as the five elective credits, statistics, genetics, and physics) can be completed anytime, even before you are admitted to the major. The directed/independent study requirement must be completed after you officially start the major (your first fall semester officially declared in the major or later).

### DIRECTED/INDEPENDENT STUDY (699), 2 CREDITS

Must be completed after matriculation into the major (i.e. the first fall semester officially declared in the major or any semester after) and have prior approval to meet PharmTox major requirements. Students should not wait until the final semester to try to fulfill this requirement, as it can be difficult to find a research opportunity close to graduation. The research-based directed/independent study (typically a course numbered 699) must be in a biological, chemical, or biomedical sciences department, and can include laboratory-based research, library or literature-based research, or clinical research. Experiences such as peer mentoring or teaching assistance, even if a 699 course is used for credit, cannot fulfill this requirement.

### PHYSICS I AND II

Code	Title	Credits
Complete one of the following sequences: (consult with advisor on recommended sequences):		
PHYSICS 103 & PHYSICS 104	General Physics and General Physics	8
PHYSICS 201 & PHYSICS 202	General Physics and General Physics	10

PHYSICS 207 & PHYSICS 208	General Physics and General Physics	10
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## STATISTICS

Code	Title	Credits
Complete one of the following:		
STAT 240	Data Science Modeling I (recommended only if pursuing an additional major or certificate in Data Science)	4
STAT 301	Introduction to Statistical Methods	3
STAT 371	Introductory Applied Statistics for the Life Sciences (recommended for most students)	3
STAT 324	Introduction to Statistics for Science and Engineering	3

## BIOCHEMISTRY

Code	Title	Credits
BIOCHEM 507 & BIOCHEM 508	General Biochemistry I and General Biochemistry II	6

## PHYSIOLOGY

Code	Title	Credits
Complete one of the following:		
ANAT&PHY 335	Physiology	5
BIOCORE 485 & BIOCORE 486	Principles of Physiology and Principles of Physiology Laboratory	5

## GENETICS

Code	Title	Credits
Complete one of the following:		
GENETICS 466	Principles of Genetics	3
GENETICS 467 & GENETICS 468	General Genetics 1 and General Genetics 2 <sup>1</sup>	6
BIOCORE 381 & BIOCORE 382 & BIOCORE 383 & BIOCORE 384	Evolution, Ecology, and Genetics and Evolution, Ecology, and Genetics Laboratory and Cellular Biology and Cellular Biology Laboratory <sup>2</sup>	10

<sup>1</sup> If students choose GENETICS 467 & GENETICS 468, 3 credits from this sequence will count towards the 5 required elective credits.

<sup>2</sup> Students who have taken BIOCORE for introductory biology will have typically also completed the genetics requirement via BIOCORE courses taken sophomore/second year.

## PATHOLOGY

Code	Title	Credits
PATH 404	Pathophysiologic Principles of Human Diseases	3

## PHARMACOLOGY AND TOXICOLOGY CORE

Code	Title	Credits
Complete all of the following:		
PHM SCI 558	Laboratory Techniques in Pharmacology and Toxicology	2
PHM SCI 679	Pharmacology and Toxicology Seminar (taken twice) <sup>1</sup>	1
PHM SCI 510	Pharmacology Principles and Applications	2
PHM SCI/ M&ENVTOX/ ONCOLOGY/ PHM COL-M/ POP HLTH 625	Toxicology I	3
PHM SCI/ M&ENVTOX/PATH/ PHM COL-M/ POP HLTH 626	Toxicology II	3

<sup>1</sup> Students need to take PHM SCI 679 in both their first and second years in the major in spring semesters (typically junior and senior years); the course is repeatable for degree credit.

## ADDITIONAL PHARMACOLOGY

Code	Title	Credits
Complete one of the following:		
BIOCHEM/ NUTR SCI 560	Principles of Human Disease and Biotechnology	2
BOTANY 421	Medical Botany	3
PATH-BIO 307	Superbugs, Sex, & Drugs: Why Modern Medicine Needs Evolutionary Biology	2
PHM SCI 581	Molecular and Cellular Principles in Pharmacology	4
PHM SCI 672	Principles of Pharmaceutical Sciences	3

## ELECTIVES IN THE MAJOR

Students must complete at least 5 elective credits in the Pharmacology and Toxicology major from the below list, in any subject. Another option for fulfilling a portion or all of these 5 credits are additional directed/independent study (699) credits beyond the minimum 2 credits required for the major. Additional 699 credits must be approved by the PharmTox program to count towards the elective requirement if they are not done under the same principle investigator that was approved for the original two credits required.

Code	Title	Credits
ANAT&PHY 337	Human Anatomy	3
ANAT&PHY 338	Human Anatomy Laboratory	2
AN SCI/DY SCI 434	Reproductive Physiology	3
BIOCHEM/ NUTR SCI 510	Nutritional Biochemistry and Metabolism	3
BIOCHEM 551	Biochemical Methods	4
BIOCHEM/ M M & I 575	Biology of Viruses	2

BIOCHEM 601	Protein and Enzyme Structure and Function	2	ZOOLOGY 425	Behavioral Ecology	3
BIOCHEM/ GENETICS/ MICROBIO 612	Prokaryotic Molecular Biology	3	ZOOLOGY 430	Comparative Anatomy of Vertebrates	5
BIOCORE 587	Biological Interactions	3	ZOOLOGY 444	Neuronal Cell Biology in Health and Disease	2
B M E 430	Biological Interactions with Materials	3	ZOOLOGY 470	Introduction to Animal Development	3
BOTANY/AMER IND/ ANTHRO 474	Ethnobotany	3-4	ZOOLOGY 555	Laboratory in Developmental Biology	3
CHEM 346	Intermediate Organic Chemistry Laboratory	1-2	ZOOLOGY 570	Cell Biology	3
CHEM 547	Advanced Organic Chemistry	3			
CHEM 561	Physical Chemistry I	3			
CHEM 562	Physical Chemistry II	3			
CHEM 563	Physical Chemistry Laboratory I	1			
CHEM 564	Physical Chemistry Laboratory II	1			
CHEM 665	Biophysical Chemistry	3			
DERM 601	Skin Biology and Skin Diseases	3			
ENVIR ST/ POP HLTH 471	Introduction to Environmental Health	3			
ENVIR ST/ POP HLTH 502	Air Pollution and Human Health	3			
FOOD SCI 550	Fermented Foods and Beverages	2			
GENETICS 545	Genetics Laboratory	2			
GENETICS 588	Immunogenetics	3			
GENETICS/ MD GENET 662	Cancer Genetics	3			
M M & I 301	Pathogenic Bacteriology	2			
M M & I 341	Immunology	3			
M M & I/PATH- BIO 528	Immunology	3			
MED PHYS/ H ONCOL 410	Radiobiology	2-3			
MICROBIO 303	Biology of Microorganisms	3			
MICROBIO 304	Biology of Microorganisms Laboratory	2			
MICROBIO 305	Critical Analyses in Microbiology	1			
MICROBIO 357	General Bioinformatics for Microbiologists	3			
MICROBIO 626	Microbial and Cellular Metabolomics	3			
M&ENVTOX/ CIV ENGR/ SOIL SCI 631	Toxicants in the Environment: Sources, Distribution, Fate, & Effects	3			
ONCOLOGY 401	Introduction to Experimental Oncology	2			
ONCOLOGY/ M M & I/ PL PATH 640	General Virology-Multiplication of Viruses	3			
PHM SCI 632	Neuroscience of Psychedelics	3			
PSYCH 450	Primate Psychology: Insights into Human Behavior	3-4			
PSYCH 454	Behavioral Neuroscience	3-4			
PSYCH/ ZOOLOGY 523	Neurobiology	3			
SOC WORK 453	Substance Use Disorders	3			

## QUALITY OF WORK REQUIREMENTS AND PASS/FAIL

Students must have a 2.000 cumulative grade point average at the time of graduation in order to earn a Pharmacology and Toxicology BS degree.

No course that is used for Pharmacology and Toxicology degree requirements may be taken as pass/fail and must be taken for a letter grade (AP, IB, or other test credits or placement exemptions are excluded from this requirement). This includes all prerequisite coursework, major requirements, School of Pharmacy BS requirements, and Core GenEd.