

## Request to Establish New Academic Program in Arizona

University: University of Arizona

<b>Name of Proposed Academic Program:</b> Bachelor of Science in Medical Pharmacology and Toxicology	
<b>Academic Department:</b> Pharmacology and Toxicology, College of Pharmacy	
<b>Geographic Site:</b> Tucson – Main Campus	
<b>Instructional Modality:</b> In-person and Hybrid	
<b>Total Credit Hours:</b> 120	
<b>Proposed Inception Term:</b> Fall 2025	
<p><b>Brief Program Description:</b></p> <p>Delve into the fascinating world of medical pharmacology and toxicology, where you'll explore the effects of venoms, poisons, drugs, and everyday chemicals on the human body and environment. Pharmacology and toxicology are complementary and interdisciplinary biomedical sciences that draw upon cell biology, systems physiology, biochemistry, molecular biology, and genetics. This major includes foundational pharmacology and toxicology coursework and electives, emphasizing reproductive, dermatological, cancer, infectious diseases, and cardiovascular foci. Whether you're interested in research, legal investigations, or setting safety standards, you'll gain an understanding of what can go wrong when exposed to harmful substances—either from pharmaceuticals, environmental factors, or occupational hazards. As the first health sciences college at the university, the College of Pharmacy offers established programs with internationally recognized pharmacologists and toxicologists. Students will work alongside researchers and our Centers of Excellence to gain expert-level toxicology instruction and training. The Bachelor of Science in Medical Pharmacology and Toxicology is the first of its kind offering a unique pathway to advanced studies or the option to jump directly into a career that significantly impacts public health and safety.</p>	
<b>Learning Outcomes and Assessment Plan:</b>	
<b>Learning Outcome #1</b>	<b>Describe the foundational principles of pharmacology and toxicology and their applications to public health and the environment.</b>
	<b>Concepts:</b> Cell biology, molecular biology, physiology, biochemistry, genetics.
	<b>Competencies:</b> Explain how drugs, venoms, poisons, and environmental chemicals affect biological systems; describe mechanisms of drug action, adverse effects, and toxicity.
	<b>Assessment Methods:</b> Exams, class discussions, research presentations (direct) and student exit survey (indirect).
	<b>Measures:</b> Instructor grading of assignments, exams, and evaluation of discussions; responses to student exit survey.

<b>Learning Outcome #2</b>	<b>Analyze the effects of toxic substances and drugs on human physiology and apply their knowledge to medical situations.</b>				
	<b>Concepts:</b> Reproductive, dermatological, cardiovascular, neurological, and cancer-related, and infectious diseases.				
	<b>Competencies:</b> Analyze case studies involving drug side effects, adverse events, poisons, venoms, and environmental toxins; assess physiological responses and predict outcomes.				
	<b>Assessment Methods:</b> Case study analyses, exams, research projects (direct) and student exit survey (indirect).				
	<b>Measures:</b> Instructor grading of case analyses, exams, and projects; responses to student exit survey.				
<b>Learning Outcome #3</b>	<b>Recognize the intersections among plants, animals, drug-like chemicals, and humans and the outcomes that can arise in these intersections.</b>				
	<b>Concepts:</b> Peer-reviewed literature reading and research; data analysis, communication of scientific findings using scientific writing.				
	<b>Competencies:</b> Design and execute experiments; analyze and interpret data related to drug efficacy, toxicity, and environmental health risks.				
	<b>Assessment Methods:</b> Research papers, lab reports, experimental design projects (direct) and student exit survey (indirect).				
	<b>Measures:</b> Instructor grading of research reports, experiments, and presentations; responses to student exit survey.				
<b>Learning Outcome #4</b>	<b>Research topics in pharmacology and toxicology and communicate findings for experts and patients.</b>				
	<b>Concepts:</b> Occupational hazards, regulatory standards, consumer product safety, environmental toxicology.				
	<b>Competencies:</b> Evaluate and communicate risks of toxic substances in occupational and environmental settings; assess compliance with safety regulations.				
	<b>Assessment Methods:</b> Regulatory compliance assignments, policy analysis reports, public health risk assessments (direct) and student exit survey (indirect).				
	<b>Measures:</b> Instructor grading of assignments and reports; responses to student exit survey.				
<b>Learning Outcome #5</b>	<b>Apply the pharmacological basis of toxicology and toxic outcomes such as side effects and adverse events.</b>				
	<b>Concepts:</b> Toxicology in environmental health, pharmaco/toxicogenomics, biomarkers of exposure, public safety, risk assessment.				
	<b>Competencies:</b> Identify and evaluate the consequences of exposure to harmful substances in humans and ecosystems; develop recommendations for minimizing public health risks.				
	<b>Assessment Methods:</b> Capstone projects, public health reports, environmental risk assessments (direct) and student exit survey (indirect).				
	<b>Measures:</b> Instructor grading of final projects, reports, and assessments; responses to student exit survey				
	LO#1: Students will apply the foundational principles of	LO#2: Students will analyze the effects of toxic substances and	LO#3: Students will understand the intersections among plants, animals,	LO#4: Students will demonstrate the ability to research topics in	LO#5: Students will apply the pharmacological basis of toxicology

		pharmacology and toxicology to public health and the environment.	drugs on human physiology and apply their knowledge to medical situations.	drug-like chemicals, and humans and the outcomes that can arise in these intersections.	pharmacology and toxicology and communicate their findings for experts and patients.	and toxic outcomes such as side effects and adverse events.
CORE	305 Writing			M	M	
	350 ADME	I	I	R	I	
	406 Pharmacology			I	R	
	427 Derma	R	R			
	429 Neuro	R	R			
	434 Sex	R	R			
	436 Cardio	R	R			
Pharmacology Category	465 Infectious	R	R			R
	467 Cancer	R	R			I
	320 Tox			I		
	420 Enviro Tox	M		R		
	451 Forensic Tox			R		R
	xxx-1 Poisoning		M	R		R
	xxx-2 Risk Assmt			R		M
Toxicology category	200 Drugs & Hums			R		
	300 Cosmetics			R		
	445 OTC		R	R		
	473 Genomics		R			I
	xxx-3 Supplements					R

Assessment Measure	Source(s) of Evidence	Data Collection Point(s)
Job placement and grad school admission statistics	Graduation survey	In students' final semester
Academic Program Review	Reviewers' responses	Every 7 years
Learning Outcome Assessment	Direct and Indirect measures	Every year via the graduation survey, and on a biennial basis for course-embedded assessments
Student interest	Enrollment numbers	Every year

**Projected Enrollment for the First Three Years:**

Year 1	Year 2	Year 3
30	60	70

**Evidence of Market Demand:**

**1. Evidence of Student Interest:**

We administered a student interest survey to measure students' perceptions of the proposed major and received 413 responses. Survey highlights include:

- 65% are "very interested" in the proposed PharmTox major topics and 34% are "somewhat interested."
- 97% think this major is unique, and not something they could easily find at another university.
- 26% report that they would have "seriously considered" this major if it had been available when they initially enrolled at UA. 60% report that they would have given it some consideration.

Overall survey results demonstrate that this major's subject areas are of interest to students. Most respondents perceive the major as unique to the University of Arizona, indicating we may attract new students who were otherwise not planning to attend U of A.

**2. Evidence of Industry Interest and Market Demand:**

The Society of Toxicology, a professional and scholarly organization of scientists from academic institutions, government, and industry representing the great variety of scientists who practice toxicology in the US and abroad, supports all academic endeavors to train future toxicologists. To this end, they have supplied us with a file with various opportunities for young toxicology/pharmacology scholars.

Graduates with a bachelor's degree in pharmacology and toxicology can enter many career and postsecondary educational paths. Some top fields for these graduates include but are not limited to agricultural/food science; biochemistry; clinical laboratory technology, epidemiology, biological science for academia, microbiology, medicine, pharmacy, nursing, veterinary medicine/science, medical scientists (risk assessment, pharmacology, toxicology), physician assistance, and environmental sciences.

Overall, pharmacology and toxicology careers are expected to grow by approximately 12.3% between 2016 and 2026 (College Factual). Also, according to the Bureau of Labor Statistics, poison control information specialists and technicians, medical courier and tissue processing technicians, blood and plasma processors, and sanitization compliance technicians are emerging careers expected to grow across the US. Nationally, pharmacology programs produce hundreds of graduates annually. For example, 479 graduates completed pharmacology programs recently (College Factual), so there is a perceived need for these degrees and this perception drives demand.

The job outlook from 2022 to 2032 is given below for each field/career choice a graduate of this proposed program may choose to pursue (Bureau of Labor Statistics).

Field	Growth (%)	Rate Exceeds Other Occupations	Annual Job Openings
<b>Agricultural/food science</b>	6	YES	3,000
<b>Medical science</b>	10	YES	7,500
<b>Biochemistry</b>	7	YES	2,800
<b>Physician assistance</b>	27	YES	12,200
<b>Biological science professors</b>	15.1	YES	—
<b>Medicine</b>	3	SAME	24,000
<b>Chemistry/materials science</b>	6	YES	7,200

<b>Environmental science</b>	6	YES	6,900
<b>Pharmacy</b>	3	SAME	13,400
<b>Forensic science</b>	13	YES	2,600
<b>Veterinary science/medicine</b>	20	YES	5,000
<b>Microbiology</b>	5	YES	1,700
<b>Epidemiology</b>	27	YES	800
<b>Clinical laboratory technology</b>	5	YES	24,000

Factors contributing to the growth of these fields include the needs of an aging population, new and increased challenges related to climate change, and emerging areas of research and discovery across STEM fields. Graduates of a Medical Pharmacology and Toxicology BS at the University of Arizona will be well prepared to address these grand challenges. We will leverage our placement on the University of Arizona's Health Sciences campus, along with our in-house relationship with the Arizona Poison & Drug Information Center, to offer hands-on learning and health science research opportunities.

**Similar Programs Offered at Arizona Public Universities:**

Bachelor of Science in Pharmacology and Toxicology, ASU

**Objection(s) Raised by Another Arizona Public University?** YES NO

Has another Arizona public university lodged a written objection to the proposed program with the proposing university and the Board of Regents within seven days of receiving notice of the proposed program?

**If Yes, Response to Objections:**

Please provide details of how the proposing university has addressed the objection. If the objection remains unresolved, please explain why it is in the best interests of the university system and the state that the Board override it.

**New Resources Required:**

No new resources are required. We will use the existing undergraduate studies infrastructure and personnel to recruit, retain, and teach these courses and any new courses.

Advising for this major can be absorbed by current college advising staff. They will maintain manageable caseloads, even with the addition of this new major, based on enrollment projections.

**Plan to Request Program/College Fee?** YES NO

**Estimated Amount:** n/a

**Fee Justification:** n/a

**Specialized Accreditation?** YES NO

**Accreditor:** n/a