

MOLECULAR AND ENVIRONMENTAL TOXICOLOGY CENTER (M&ENVTOX)

M&ENVTOX/ONCOLOGY/PHM SCI/PHM COL-M/POP HLTH 625 – TOXICOLOGY I

3 credits.

Basic principles of toxicology and biochemical mechanisms of toxicity in mammalian species and man. Correlation between morphological and functional changes caused by toxicants in different organs of the body.

Requisites: (BIOCHEM 501 or 508) and (ANAT&PHY 335, 435, or (BIOCORE 485 and 486)) and PATH 404; or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2025

Learning Outcomes: 1. Discuss the physiology and pathology of toxicology, understanding the basic fundamentals of toxicology and toxic agents

Audience: Both Grad & Undergrad

2. Demonstrate metabolism and breakdown of toxicants using a given dataset

Audience: Both Grad & Undergrad

3. Recognize various experimental models to obtain scientific results

Audience: Both Grad & Undergrad

4. Implement knowledge to design experiments applicable to one's own research

Audience: Both Grad & Undergrad

5. Critique an example of toxicology in media and develop a presentation of this example

Audience: Both Grad & Undergrad

6. Explore new areas to assist in career development via journal club

Audience: Graduate

M&ENVTOX/PATH/PHM SCI/PHM COL-M/POP HLTH 626 – TOXICOLOGY II

3 credits.

Survey of the basic methods and fundamental biochemical mechanisms of toxicity. Toxicity in mammalian organ systems, techniques for evaluating toxicity, as well as mechanisms of species specificity, and environmental interactions (with toxicant examples) are presented.

Requisites: POP HLTH/M&ENVTOX/ONCOLOGY/PHM SCI/PHM COL-M 625

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2026

Learning Outcomes: 1. Explain and identify the effects of toxicants on specific organs within the human body

Audience: Both Grad & Undergrad

2. Demonstrate metabolism and reactions of toxicants within organ systems using a given dataset

Audience: Both Grad & Undergrad

3. Classify different means of risk assessment and the conceptual rationale behind these methods

Audience: Both Grad & Undergrad

4. Implement knowledge to design experiments applicable to one's own research

Audience: Both Grad & Undergrad

5. Relate specific organ concepts with conceptual examples from M&ENVTOX 625 to enhance scientific understanding

Audience: Undergraduate

6. Appraise concepts to research to identify future research concepts.

Audience: Graduate

M&ENVTOX/CIV ENGR/SOIL SCI 631 – TOXICANTS IN THE ENVIRONMENT: SOURCES, DISTRIBUTION, FATE, & EFFECTS

3 credits.

Nature, sources, distribution, and fate of contaminants in air, water, soil, and food and potential for harmful exposure.

Requisites: (CHEM 104, 109, or 116) and (MATH 211, 217, or 221) and (PHYSICS 104, 202, 208, or 248), or graduate/professional standing

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2026

Learning Outcomes: 1. Describe how the physicochemical properties of an organic chemical and equilibrium and kinetic principles influence the distribution of the chemical in the environment

Audience: Both Grad & Undergrad

2. Estimate the physico-chemical properties of organic compounds using linear free energy relationships

Audience: Both Grad & Undergrad

3. Predict the behavior of hazardous organic chemicals in the environment

Audience: Both Grad & Undergrad

4. Derive and use equilibrium and kinetic box models for determining the fate of organic pollutants in the environment

Audience: Graduate

M&ENVTOX 699 – SPECIAL PROBLEMS

1-3 credits.

Directed study projects as arranged with instructor.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Summer 2022

Learning Outcomes: 1. Apply concepts learned in coursework to real life situations

Audience: Undergraduate

2. Read and effectively search scientific literature

Audience: Undergraduate

3. Develop critical, analytical, and independent thinking skills

Audience: Undergraduate

M&ENVTOX 800 – SEMINAR

1 credit.

Current research in environmental toxicology and pathology and other topics of interest and importance to environmental toxicologists.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2026

Learning Outcomes: 1. Design, develop, and present research to audiences of peers within and outside of research area.

Audience: Graduate

2. Evaluate data and appraise presentations.

Audience: Graduate

3. Recognize opportunities in research tools and professional development to further career trajectory.

Audience: Graduate

4. Synthesize data from others to apply towards own research.

Audience: Graduate

M&ENVTOX 801 – SCIENTIFIC COMMUNICATION IN MOLECULAR & ENVIRONMENTAL TOXICOLOGY

2 credits.

Provides an overview of scientific communication; specifically, students will be exposed to the various methods of communicating their science including articles, proposals, presentations / lectures, and posters. Strategies will demonstrate best practices for each method and enable students to critically define what sets apart good examples from poor. Classroom discussions allow for comprehension of these means. Assignments are designed to familiarize the students with these methods. Students will have classroom instruction and the opportunity to learn from peer mentors as well as laboratory directors on different preferences and approaches to science communication.

Requisites: Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2026**Learning Outcomes:** 1. Identify best practices when communicating science in multiple forms

Audience: Graduate

2. Synthesize data to create a coherent hypothesis for research question

Audience: Graduate

3. Analyze sources and approaches necessary for a scientific literature review

Audience: Graduate

4. Integrate knowledge to critique a scientific publication that is under review

Audience: Graduate

5. Produce preliminary sections for use in a scientific manuscript

Audience: Graduate

6. Evaluate how to critique scientific proposals and compose meaningful feedback

Audience: Graduate

7. Produce a document for use as a preliminary exam and / or fellowship proposal

Audience: Graduate

8. Organize preliminary data generated in mentored laboratory into a research poster that is both appealing and informative

Audience: Graduate

9. Create a PowerPoint presentation, which will teach students and classmates about a scientific tool or otherwise professional development topic, whose knowledge will be beneficial to students as they advance their careers

Audience: Graduate

10. Produce a Teaching Philosophy statement to start a professional teaching portfolio

Audience: Graduate

M&ENVTOX 990 – RESEARCH

1-9 credits.

Independent research and writing for graduate students under the supervision of a faculty member.

Requisites: Consent of instructor**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2026**Learning Outcomes:** 1. Exhibit a broad understanding of general toxicology principles

Audience: Graduate

2. Conduct independent research using a variety of approaches

Audience: Graduate

3. Think critically to address research challenges

Audience: Graduate

4. Exhibit and foster professional and ethical conduct in their research

Audience: Graduate

5. Collaborate with other investigators within or outside of the thesis lab

Audience: Graduate