

Toxicology (TOX)

TOX 201 Poisons, People and the Environment (3 credit hours)

TOX 201 serves as an introduction to the fascinating world of chemical poisons and covers their numerous and varied effects on human health and the environment. We will learn how and why poisons have played an important history, how to critically evaluate the chemical risk information reported in the media, in addition to the underlying principles of the basic science of poisons.

GEP Natural Sciences

Typically offered in Fall, Spring, and Summer

TOX 400 Undergraduate Seminar in Toxicology (1 credit hours)

In this seminar course students will be exposed to different presenters each week who will speak on current topics in toxicology, presenting their research on that topic in a broader context. Specific topic areas will vary from semester to semester, but will always be relevant to environmental and molecular toxicology. Students will be expected to write two 1-2 page reflection essays over the course of the semester and participate in a current events in toxicology discussion forum.

Restriction: 17ETM Only

Typically offered in Spring only

TOX 401/TOX 501 Principles of Toxicology (4 credit hours)

Introduce students to the basic principles of toxicology. Will cover the history and scope of the field; absorption, distribution, metabolism and elimination of toxicants; types and mechanisms of toxic action; carcinogenesis; environmental toxicology as well as human and ecological risk assessment.

Prerequisite: CH 220 or CH 221 or CH 225; BIO 181 or ZO 160

Typically offered in Spring only

TOX 415 Environmental Toxicology and Chemistry (4 credit hours)

Environmental toxicology and chemistry including the sources, fate, and effects of chemicals in the environment. Emphasis on contemporary problems in human health and the environment.

Prerequisite: CH 220 or CH 221 or CH 225; BIO 181 or ZO 160 recommended

Typically offered in Fall and Spring

TOX 501/TOX 401 Principles of Toxicology (4 credit hours)

Introduce students to the basic principles of toxicology. Will cover the history and scope of the field; absorption, distribution, metabolism and elimination of toxicants; types and mechanisms of toxic action; carcinogenesis; environmental toxicology as well as human and ecological risk assessment.

Prerequisite: CH 220 or CH 221 or CH 225; BIO 181 or ZO 160

Typically offered in Spring only

TOX 515 Environmental Toxicology (4 credit hours)

Evaluation of the nature, distribution and significance of microchemical contamination. Emphasis on current, relevant problems.

Prerequisite: Two years of biology

TOX 558/FS 558/NTR 558 Food Toxicology (3 credit hours)

This course evaluates the weight of evidence from peer-reviewed scientific literature relating the presence of chemical or biological toxins, whether naturally occurring or man-made in the food system to health outcomes. Toxicological data are viewed in the context of processing effects, global food and supplement regulations, as well as commercial marketing claims and sustainability. Key concepts include dose-response, phase I and phase II metabolism, signal transduction, and the use of advanced technologies such as genomics, proteomics, and metabolomics. Students will work in teams to develop and write a critical review manuscript suitable for publication.

Prerequisite: Graduate standing or advanced undergraduate students enrolled in Food Science, Nutrition, or Toxicology majors.

Typically offered in Fall only

This course is offered alternate even years

TOX 595 Special Topics (1-6 credit hours)

TOX 601 Toxicology Seminar (1 credit hours)

Prerequisite: Graduate standing

Typically offered in Fall and Spring

TOX 620 Special Problems (1-6 credit hours)

Topics include responsibility in science, environmental fate of chemicals, developmental toxicology, lab rotations, journal club and wildlife toxicology.

Prerequisite: Graduate standing

Typically offered in Fall, Spring, and Summer

TOX 688 Non-Thesis Masters Continuous Registration - Half Time Registration (1 credit hours)

For students in non-thesis master's programs who have completed all credit hour requirements for their degree but need to maintain half-time continuous registration to complete incomplete grades, projects, final master's exam, etc.

Prerequisite: Master's student

Typically offered in Spring only

TOX 689 Non-Thesis Master Continuous Registration - Full Time Registration (3 credit hours)

For students in non-thesis master's programs who have completed all credit hour requirements for their degree but need to maintain full-time continuous registration to complete incomplete grades, projects, final master's exam, etc. Students may register for this course a maximum of one semester.

Prerequisite: Master's student

Typically offered in Spring only

TOX 690 Master's Exam (1-9 credit hours)

For students in non thesis master's programs who have completed all other requirements of the degree except preparing for and taking the final master's exam.

Prerequisite: Master's student

Typically offered in Fall, Spring, and Summer

TOX 693 Master's Supervised Research (1-9 credit hours)

Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Master's student

Typically offered in Fall, Spring, and Summer

TOX 695 Master's Thesis Research (1-9 credit hours)

Thesis research.

Prerequisite: Master's student

Typically offered in Fall, Spring, and Summer

TOX 696 Summer Thesis Research (1 credit hours)

For graduate students whose programs of work specify no formal course work during a summer session and who will be devoting full time to thesis research.

Prerequisite: Master's student

Typically offered in Summer only

TOX 699 Master's Thesis Preparation (1-9 credit hours)

For students who have completed all credit hour requirements and full-time enrollment for the master's degree and are writing and defending their theses.

Prerequisite: Master's student

Typically offered in Spring and Summer

TOX 701 Principles and Mechanisms of Molecular and Biochemical Toxicology, I (3 credit hours)

This course covers the general principles of toxicology including xenobiotic dose response relationships, absorption, distribution, elimination, metabolism, excretion, and pharmacokinetic modeling. The course then focuses on the molecular and biochemical basis of toxicant action, first at the cellular level involving cell injury, necrotic cell death, regulated cell death and pathology and then at the organ level involving acute toxicity in the kidney, lung and liver. The course also covers endocrine disruption, mutagenesis, DNA repair and chronic toxicity involving carcinogenesis and the importance of critical windows of exposure.

Prerequisite: BCH 451, Graduate standing

Typically offered in Fall only

TOX 702 Principles and Mechanisms of Molecular and Biochemical Toxicology, II (3 credit hours)

This course covers the biochemical, molecular and cellular mechanisms through which xenobiotics disrupt development and the cardiovascular, immune, nervous, dermal and reproductive systems to produce toxicity and adverse outcomes at the organ/organism level. The course covers emerging contaminants, the role of genetics and epigenetics in individual susceptibility to xenobiotics and the use of "omics" approaches to study the underlying mechanisms of toxicity. Software packages for omics analysis and databases to advance our understanding of mechanisms will be introduced. Principles of epidemiology and community engagement will be discussed and specialized areas of toxicology including regulatory and industrial toxicology and human health risk assessment will be highlighted.

Prerequisite: TOX 701 and BCH 451; Graduate standing.

Typically offered in Spring only

TOX 704 Chemical Risk Assessment (1 credit hours)

Concepts and vocabulary of risk assessment. Risk assessment models and techniques used in cancer and non-cancer risk assessment and strategies for successful risk communications. Case studies of risk assessment and issues of current interest. Utilization of background in toxicology and statistics to examine a critical end-point in toxicological science, the quantitative risk assessment.

Prerequisite: TOX 701, a ST course

TOX 715 Environmental Toxicology (3 credit hours)

Evaluation of fundamental processes relating fate and effects of chemicals in the environment. Emphasis on effects of pollutants on non-human species, environmental risk assessment and historically relevant incidents of environmental contaminants.

Prerequisite: Two years of biology

Typically offered in Fall only

TOX 725/CS 725/HS 725/SSC 725 Pesticide Chemistry (1 credit hours)

Chemical properties of pesticides including hydration and solvation, ionization, volatilization, lipophilicity, molecular structure and size, and reactivity and classification according to chemical description, mode of action or ionizability. Taught during the first 5 weeks of semester. Drop date is last day of 3rd week of the minicourse.

Prerequisite: (CH 201 or CH 203) and (CH 221 or CH 225)

Typically offered in Spring only

TOX 727/CS 727/HS 727/SSC 727 Pesticide Behavior and Fate in the Environment (2 credit hours)

Sorption/desorption, soil reactivity, movement, volatilization, bioavailability, degradation and stability of pesticides in the environment. Taught during the last 10 weeks of semester. Drop date is last day of 3rd week of the minicourse.

Prerequisite: CS(HS,SSC,TOX) 725,SSC 200

Typically offered in Spring only

TOX 795 Special Topics in Toxicology (1-6 credit hours)

Typically offered in Fall and Spring

TOX 801 Toxicology Seminar (1 credit hours)

Prerequisite: Graduate standing

Typically offered in Fall and Spring

TOX 820 Special Problems in Toxicology (1-6 credit hours)

Topics include responsibility in science, environmental fate of chemicals, developmental toxicology, lab rotations, Journal Club, and wildlife toxicology.

Prerequisite: Graduate standing

Typically offered in Fall and Spring

TOX 861 Responsible Conduct in Research (1 credit hours)

This course provides an overview of the ethical responsibilities of a graduate student or post-doctoral trainee while conducting research. This includes ethical conduct related to experimental design, reporting and investigation of misconduct, grant applications, technology transfer, peer review process, animal welfare, and risk communication.

Restriction: Graduate Standing, TOX major or permission by instructor

Typically offered in Fall only

TOX 890 Doctoral Preliminary Examination (1-9 credit hours)

For students who are preparing for and taking written and/or oral preliminary exams.

Prerequisite: Doctoral student

Typically offered in Fall, Spring, and Summer

TOX 893 Doctoral Supervised Research (1-9 credit hours)

Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Doctoral student

Typically offered in Fall, Spring, and Summer

TOX 895 Doctoral Dissertation Research (1-9 credit hours)

Dissertation research.

Prerequisite: Doctoral student

Typically offered in Fall, Spring, and Summer

TOX 896 Summer Dissertation Research (1 credit hours)

For graduate students whose programs of work specify no formal course work during a summer session and who will be devoting full time to thesis research.

Prerequisite: Doctoral student

Typically offered in Summer only

TOX 899 Doctoral Dissertation Preparation (1-9 credit hours)

For students who have completed all credit hour, full-time enrollment, preliminary examination, and residency requirements for the doctoral degree, and are writing and defending their dissertations.

Prerequisite: Doctoral student

Typically offered in Fall, Spring, and Summer