**TOXICOLOGY (TOX)**

**TOX 360. *THE WORLD OF POISONS. (3 Credits)*
Provides a basic understanding of how we are exposed and respond to chemicals, examples of human diseases associated with toxic insult, the role of technology and the interface of society and toxicology in risk perception and legislation. (Bacc Core Course)
Attributes: CSST – Core, Synthesis, Science/Technology/Society

**TOX 401. RESEARCH. (1-16 Credits)
This course is repeatable for 16 credits.

**TOX 405. READING AND CONFERENCE. (1-16 Credits)
This course is repeatable for 16 credits.

**TOX 411. FUNDAMENTALS OF TOXICOLOGY. (3 Credits)
Introduction to the discipline of toxicology. Examination of the basic concepts that define how chemicals are absorbed, distributed, metabolized, and eliminated by the body. Overview of associated dose/response relations.
Prerequisites: BB 350 (may be taken concurrently) with D- or better or BB 450 (may be taken concurrently) with D- or better or BB 490 (may be taken concurrently) with D- or better

**TOX 413. ENVIRONMENTAL TOXICOLOGY AND RISK ASSESSMENT. (3 Credits)
Procedures for defining exposure and the use of toxicological data in defining risk assessment. Recent application of mechanistic concepts are reviewed.
Prerequisites: TOX 411 with D- or better

**TOX 429. TOXIC SUBSTANCES IN FOOD. (3 Credits)
Toxicology and epidemiology of human exposures to pesticides and food toxicants.
Prerequisites: BB 350 (may be taken concurrently) with D- or better or BB 450 (may be taken concurrently) with D- or better or BB 490 (may be taken concurrently) with D- or better

**TOX 430. CHEMICAL BEHAVIOR IN THE ENVIRONMENT. (3 Credits)
Applications of chemical concepts in the definition and solution of pollution problems; analytical considerations, thermodynamic factors influencing movement of chemicals, physical and metabolic transformations occurring in the environment.
Prerequisites: CH 123 with D- or better or CH 331 with D- or better

**TOX 435. *GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK. (3 Credits)*
A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/rec. CROSSTLISTED as FES 435/FES 535, FES 435H, MCB 535. (Bacc Core Course)
Attributes: CSST – Core, Synthesis, Science/Technology/Society
Equivalent to: FES 435, FES 435H, MCB 535

**TOX 435H. *GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK. (3 Credits)*
A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/rec. CROSSTLISTED as BI 435H, FS 435H. (Bacc Core Course)
Attributes: CSST – Core, Synthesis, Science/Technology/Society; HNRS – Honors Course Designator
Equivalent to: FES 435, TOX 435

**TOX 455. ECOTOXICOLOGY: AQUATIC ECOSYSTEMS. (3 Credits)
Focuses on transport, fate, and effects of toxic substances in freshwater ecosystems. There is special emphasis on impacts on fish.
Prerequisites: CH 331 with D- or better

**TOX 490. ENVIRONMENTAL FORENSIC CHEMISTRY. (3 Credits)
Principles of Good Laboratory Practice Standards, methodology, utility and limitations of chemical forensic methods as applied to real investigations.

**TOX 499. SPECIAL TOPICS. (1-16 Credits)
This course is repeatable for 16 credits.

**TOX 501. RESEARCH. (1-16 Credits)
This course is repeatable for 16 credits.

**TOX 503. THESIS. (1-16 Credits)
This course is repeatable for 999 credits.

**TOX 505. READING AND CONFERENCE. (1-16 Credits)
This course is repeatable for 16 credits.

**TOX 507. SEMINAR. (1-16 Credits)
This course is repeatable for 16 credits.

**TOX 511. FUNDAMENTALS OF TOXICOLOGY. (3 Credits)
Introduction to the discipline of toxicology. Examination of the basic concepts that define how chemicals are absorbed, distributed, metabolized, and eliminated by the body. Overview of associated dose/response relations.
Prerequisites: BB 550 (may be taken concurrently) with C or better or BB 590 (may be taken concurrently) with C or better

**TOX 512. TARGET ORGAN TOXICOLOGY. (3 Credits)
Examination of toxicological effects of chemicals at organ level. Normal physiology of the organ system is received.
Prerequisites: TOX 511 with C or better

**TOX 513. ENVIRONMENTAL TOXICOLOGY AND RISK ASSESSMENT. (3 Credits)
Procedures for defining exposure and the use of toxicological data in defining risk assessment. Recent application of mechanistic concepts are reviewed.
Prerequisites: TOX 511 with C or better

**TOX 529. TOXIC SUBSTANCES IN FOOD. (3 Credits)
Toxicology and epidemiology of human exposures to pesticides and food toxicants.

**TOX 530. CHEMICAL BEHAVIOR IN THE ENVIRONMENT. (3 Credits)
Applications of chemical concepts in the definition and solution of pollution problems; analytical considerations, thermodynamic factors influencing movement of chemicals, physical and metabolic transformations occurring in the environment.

**TOX 535. GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK. (3 Credits)
A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/rec. CROSSTLISTED as FES 435/FES 535, FES 435H, MCB 535.
Equivalent to: FES 535, MCB 535
TOX 554. GENOME ORGANIZATION, STRUCTURE, AND MAINTENANCE. (4 Credits)
How diverse organisms store their individual sets of genetic information (genomes). Evolution of genomes and gene families. Structures of DNA and chromosomes. Biochemical and regulatory pathways that protect cellular genomes against environmental and endogenous damage and ensure transmission of faithful copies to progeny. Remodeling of genomes by recombination and transposition. CROSSLISTED as MCB 554.
Equivalent to: MCB 554

TOX 555. ECOTOXICOLOGY: AQUATIC ECOSYSTEMS. (3 Credits)
Focuses on transport, fate, and effects of toxic substances in freshwater ecosystems. There is special emphasis on impacts on fish.

TOX 575. ADVANCED XENOBIOTIC METABOLISM AND DISPOSITION. (2 Credits)
The course will focus on structure, function and regulation of specific proteins that function in uptake, distribution, metabolism, and excretion of drugs and other chemicals that are foreign to the body (xenobiotics). The course will focus on proteins which are termed Phase I and Phase II xenobiotic metabolizing enzymes and xenobiotic transporters. There will be an emphasis on Cytochrome P450 enzymes and hepatic and renal xenobiotic transporter proteins and their key roles in xenobiotic metabolism and excretion.

TOX 590. ENVIRONMENTAL FORENSIC CHEMISTRY. (3 Credits)
Principles of Good Laboratory Practice Standards, methodology, utility and limitations of chemical forensic methods as applied to real investigations.

TOX 599. SPECIAL TOPICS. (1-16 Credits)
This course is repeatable for 16 credits.

TOX 601. RESEARCH. (1-16 Credits)
This course is repeatable for 16 credits.

TOX 603. THESIS. (1-16 Credits)
This course is repeatable for 999 credits.

TOX 605. READING AND CONFERENCE. (1-16 Credits)
This course is repeatable for 16 credits.

TOX 607. SEMINAR. (1-16 Credits)
This course is repeatable for 16 credits.

TOX 611. TESTING FOR GENOTOXICITY. (4 Credits)
A lab-based course geared toward toxicology, biochemistry, biology, food science, nutrition, pharmacy and MCB students. Introduces principles and methods of several key assays used to screen for DNA damage and mutation. These tests will include the following: (i) Salmonella mutagenicity assay (Ames test'), (ii) single cell gel electrophoresis ('comet') assay, (iii) micronucleus assay, and (iv) PCR-based single strand conformation polymorphism (SSCP) screening for oncogene/tumor suppressor gene mutation in cancers. This 2-week, intensive lab/lecture class runs Mon-Fri in the LPSC during the first session of summer term. Each day includes laboratory work and a 2-hour lecture covering basic principles of the assays, as well as technical details of the experiment for the day.
Prerequisites: TOX 514 with C or better

TOX 699. SPECIAL TOPICS. (1-16 Credits)
This course is repeatable for 16 credits.

TOX 808. WORKSHOP. (1-16 Credits)
This course is repeatable for 16 credits.