Courses primarily for undergraduates:

**TOX 354: General Pharmacology**  
(Dual-listed with TOX 554). (Cross-listed with B M S). (3-0) Cr. 3. S.  
*Prereq: B M S 549 and B M S 552; BBMB 404, BBMB 405*  
General principles; drug disposition; drugs acting on the nervous, cardiovascular, renal, gastrointestinal, and endocrine systems.

**TOX 401: Principles of Toxicology**  
(Dual-listed with TOX 501). (3-0) Cr. 3. F.  
*Prereq: BBMB 404 or equivalent*  
Principles of toxicology governing entry, fate, and effects of toxicants on living systems. Includes toxicokinetics and foreign compound metabolism relative to toxification or detoxification. Fundamentals of foreign compound effects on metabolism, physiology, and morphology of different cell types, tissues, and organ systems.

**TOX 419: Foodborne Hazards**  
(Cross-listed with FS HN, MICRO). (3-0) Cr. 3. Alt. S., offered even-numbered years.  
*Prereq: MICRO 201 or MICRO 302, a course in biochemistry*  
Pathogenesis of human microbiological foodborne infections and intoxications, principles of toxicology, major classes of toxicants in the food supply, governmental regulation of foodborne hazards. Assessed service learning component. Only one of FS HN 419 and FS HN 519 may count toward graduation.

**TOX 420: Food Microbiology**  
(Cross-listed with FS HN, MICRO). (3-0) Cr. 3. F.  
*Prereq: MICRO 201 or MICRO 302*  
Effects of microbial growth in foods. Methods to control, detect, and enumerate microorganisms in food and water. Foodborne infections and intoxications.

**TOX 426: Veterinary Toxicology**  
(Dual-listed with TOX 526). (Cross-listed with VDPAM). (3-0) Cr. 3. S.  
*Prereq: Third year classification in veterinary medicine*  
Study of toxicological diseases of animals emphasizing clinical recognition, circumstances of poisoning, differential diagnosis with clinical and laboratory data, therapeutic procedures, preventive management and public health implications. Supplemented with case-based materials.

**TOX 429: Foodborne Toxicants**  
(Dual-listed with TOX 529). (2-0) Cr. 2. Alt. F., offered odd-numbered years.  
*Prereq: A course in biochemistry*  
Mechanisms of action, metabolism, sources, remediation or detoxification, risk assessment of major foodborne toxicants of current interest, design of HACCP plans for use in food industries targeting foodborne toxicants. Taught online only.

**TOX 490: Independent Study**  
Cr. 1-2. Repeatable. F.S.S.  
*Prereq: Permission of instructor is required prior to registration.*  
Independent study with a faculty mentor. Intended for students enrolled in the Pharmacology and Toxicology minor. Intended for students enrolled in the Pharmacology and Toxicology minor may use no more than 9 credits of university-wide 490 credits towards the total of 120 credits required for graduation.

**TOX 499: Undergraduate Research**  
Cr. 1-3. Repeatable, maximum of 3 credits. F.S.S.  
*Prereq: Permission of instructor is required prior to registration.*  
Independent research under faculty guidance. Intended for students enrolled in the Pharmacology and Toxicology minor. Offered on a satisfactory-fail basis only. Students may use no more than 9 credits of university-wide 499 credits towards the total of 120 credits required for graduation.

Courses primarily for graduate students, open to qualified undergraduates:

**TOX 501: Principles of Toxicology**  
(Dual-listed with TOX 401). (3-0) Cr. 3. F.  
*Prereq: BBMB 404 or equivalent*  
Principles of toxicology governing entry, fate, and effects of toxicants on living systems. Includes toxicokinetics and foreign compound metabolism relative to toxification or detoxification. Fundamentals of foreign compound effects on metabolism, physiology, and morphology of different cell types, tissues, and organ systems.

**TOX 502: Toxicology Methods**  
(0-6) Cr. 3. Alt. S., offered even-numbered years.  
*Prereq: TOX 501*  
Provides demonstrations or laboratory experience in the application of methods used in toxicology, including safety procedures, calculation and data analysis, teratologic and morphologic evaluation, cellular/molecular toxicological techniques, electrophysiologic measures, in vitro enzyme induction/biotransformation, neural and behavioral toxicology testing.
TOX 504: Toxicology Seminar  
(1-0) Cr. 1. Repeatable, maximum of 2 credits. F.S.SS.  
Prereq: Permission of instructor required  
Presentation of a seminar about a current topic in toxicology as part of a weekly series of seminars by graduate students, faculty, and guest lecturers from off campus. Graduate student speakers will meet with the instructor at least one week prior to their formal presentation.

TOX 506: Diet and Cancer Prevention  
(Cross-listed with NUTRS). (1-0) Cr. 1. Alt. F., offered even-numbered years.  
Prereq: BBMB 404 and BBMB 405 or BBMB 420  
Principles of cancer biology and cancer etiology will be integrated with the impacts of diet on cancer development and prevention. Contributions of research with humans, animals, cultured cells and cell free systems will be included. The importance of dietary contaminants, macronutrients and micronutrients will be examined with an emphasis on the strength of the evidence and mechanisms of action.

TOX 515: Regulatory Toxicology  
(1-0) Cr. 1. Alt. F., offered odd-numbered years.  
Prereq: BBMB 404 or FSHN 403  
Survey of approaches used by toxicologists in government and industry for generating, enforcing and complying with laws and regulations. Regulatory policies and decision making. Toxicological risk assessment and risk analysis.

TOX 526: Veterinary Toxicology  
(Dual-listed with TOX 426). (Cross-listed with VDPAM). (3-0) Cr. 3. S.  
Prereq: Third year classification in veterinary medicine  
Study of toxicological diseases of animals emphasizing clinical recognition, circumstances of poisoning, differential diagnosis with clinical and laboratory data, therapeutic procedures, preventive management and public health implications. Supplemented with case-based materials.

TOX 529: Foodborne Toxicants  
(Cross-listed with FS HN). (2-0) Cr. 2. F.  
Prereq: A course in biochemistry; enrollment in GP-IDEA Food Safety and Defense Graduate Certificate or permission of instructor.  
Mechanisms of action, metabolism, sources, remediation/detoxification, risk assessment of major foodborne toxicants of current interest, design of HAACP plans for use in food industries targeting foodborne toxicants, discussion of toxicants from a food defense perspective. Offered online only.

TOX 546: Clinical and Diagnostic Toxicology  
(Cross-listed with VDPAM). (0-3) Cr. 1-3. Repeatable. F.S.SS.  
Prereq: D.V.M. degree or VDPAM 526  
Advanced study of current problems and issues in toxicology. Emphasis on problem solving utilizing clinical, epidemiological, and laboratory resources.

TOX 550: Pesticides in the Environment  
(Cross-listed with ENT). (3-0) Cr. 3. S.  
Prereq: 9 credits of biological sciences  
Fate and significance of pesticides in soil, water, plants, animals, and the atmosphere.

TOX 554: General Pharmacology  
(Dual-listed with TOX 354). (Cross-listed with B M S). (3-0) Cr. 3. S.  
Prereq: B M S 549 and B M S 552; BBMB 404, BBMB 405  
General principles; drug disposition; drugs acting on the nervous, cardiovascular, renal, gastrointestinal, and endocrine systems.

TOX 555: Methods in Biostatistics and Epidemiology  
(Cross-listed with STAT). (3-0) Cr. 3. Alt. F., offered even-numbered years.  
Prereq: STAT 500 or STAT 401; STAT 543 or STAT 447  
Statistical methods commonly used in epidemiology and human and animal health studies. Overview of cohort studies, case-control studies and randomized clinical trials. Topics include inference procedures for disease risk factors, analysis of time-to-event and survival data, analysis of longitudinal studies of disease progression and health status, diagnostic test evaluation, and meta-analysis. Examples will come from recent studies of physical and mental health, nutrition and disease progression in human and animal populations. Use of statistical software: SAS or R.

TOX 570: Risk Assessment for Food, Agriculture and Veterinary Medicine  
(Cross-listed with AGRON, VDPAM). (3-0) Cr. 3. Alt. F., offered odd-numbered years.  
Prereq: Statistics 300-level or higher.  
TOX 575: Cell Biology
(Cross-listed with B M S). (3-0) Cr. 3.
Prereq: 10 credits in biological science and permission of instructor
A multi-instructor course covering major topics in cell structure and
function, including: universal features of prokaryotic and eukaryotic cells,
types of utilization and conversion of energy, genetic control of cell shape
and functionality, internal organization of cells, communication between
cells and their environment, development of multicellular systems.
Students have to write a term paper.

TOX 590: Special Topics
Cr. arr. Repeatable.
Contact individual faculty for special projects or topics. Graded.

Courses for graduate students:

TOX 626: Advanced Food Microbiology
(Cross-listed with FS HN, MICRO). (3-0) Cr. 3. Alt. F., offered odd-numbered
years.
Prereq: FS HN 420 or FS HN 421 or FS HN 504
Topics of current interest in food microbiology, including new foodborne
pathogens, rapid identification methods, effect of food properties and
new preservation techniques on microbial growth, and mode of action of
antimicrobials.

TOX 627: Rapid Methods in Food Microbiology
(Cross-listed with FS HN, MICRO). (2-0) Cr. 2. Alt. F., offered even-
numbered years.
Prereq: FS HN 420 or FS HN 421 or FS HN 504
Provides an overview of rapid microbial detection methods for use in
foods. Topics include historical aspects of rapid microbial detection,
basic categories of rapid tests (phenotypic, genotypic, whole cell, etc.),
existing commercial test formats and kits, automation in testing, sample
preparation and “next generation” testing formats now in development.

TOX 656: Cellular and Molecular Pathology II
(Cross-listed with V PTH). (3-0) Cr. 3. Alt. S., offered even-numbered years.
Prereq: Graduate course in biochemistry, genetics, or cell biology
Cellular and molecular mechanisms of carcinogenesis.

TOX 675: Insecticide Toxicology
(Cross-listed with ENT). (2-3) Cr. 3. Alt. F., offered even-numbered years.
Prereq: ENT 555 or TOX 501
Principles of insecticide toxicology; classification, mode of action,
metabolism, and environmental effects of insecticides.

TOX 689: Current Topics in Toxicology
Cr. R. Repeatable. F.S.
Lecture and discussion participation on current topics in toxicology.
An 80% attendance is expected to satisfactorily complete the course.
Offered on a satisfactory-fail basis only.

TOX 697: Graduate Research Rotation
(0-12) Cr. 1-12. Repeatable, maximum of 3 times. F.S.S.
Prereq: Admission to Toxicology graduate program
Graduate research projects performed under the supervision of selected
faculty members in the graduate Toxicology major.

TOX 699: Research
Cr. arr. Repeatable. F.S.S.
Research.