Spring 2023

EVSC 416: Environmental Toxicology and EVSC 616 Toxicology

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NJIT New Jersey Institute of Technology

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

EVSC 416: Environmental Toxicology
EVSC 616: Toxicology
Spring 2023 Course Syllabus

COURSE INFORMATION

Monday and Friday 10:00-11:20 am

Credits: 3

Instructor: Professor Genoa Warner, 366 Tiernan Hall, grw4@njit.edu

Location: KUPF 108

Delivery Format: In person ONLY

Office Hours: Tuesdays from 1:30 PM-2:30 PM and other times by appointment (virtual or in person).

DESCRIPTION

This course introduces the basic principles of toxicology, including dose response, absorption and distribution, metabolism, and toxicokinetics. We will discuss classes of chemicals, including industrial chemicals, pharmaceuticals, metals, pesticides, environmental pollutants, food additives, and plant and animal toxins and their impacts on humans and animals. We will consider mechanisms of toxicity including carcinogenicity, teratogenicity, and endocrine disruption. We will discuss these topics in the context of forensic toxicology, environmental toxicology, and risk assessment.

Prerequisites: CHEM 126

COURSE OBJECTIVES:

The goal of this course is to incorporate interdisciplinary thinking about the health risks of hazardous substances into student perspectives. Understanding of the principles of toxicology is necessary for building a sustainability mindset for future thinkers, inventors, and leaders. Students will think, speak, and write critically about current topics in toxicology.

LEARNING OUTCOMES

1. Distinguish between and define toxins and toxicants.
2. Describe the principles of dose response and analyze a dose response curve.
3. Explain how toxicants undergo absorption, distribution, and excretion in biological systems.
4. Explain the pathways and mechanisms of biotransformation.
5. Describe the major mechanisms of genomic toxicity, carcinogenesis, and developmental toxicity.
6. Identify the major mechanisms and endpoints for major classes of toxicants.
7. Explain how endocrine disrupting chemicals are unique as toxicants.
8. Describe the relevance of toxicology to our local history.
9. Identify examples of applications of toxicology to the environment, forensics, sustainability, and food science.
10. Identify the role of government agencies in regulation and risk assessment.
11. Analyze and critique peer reviewed literature in toxicology.

ASSESSMENT OF LEARNING

Grading Policy: The final grade in this course will be determined as follows:

Assessment	416	616
Participation	20%	20%
Book Summary	10%	10%
Presentation	25%	25%
Paper – outline	5%	5%
Paper – background	20%	15%
Paper – literature analysis	20%	15%
Paper – literature critique	-	10%

Grading Criteria: Your final letter grade in this course will be based on the following tentative curve:

A	90-100%	**C**	70-76%
B+	87-89%	**D**	60-69%
B	80-86%	**F**	<60%
C+	77-79%		

Participation: Most class periods will include in class work or discussions that will be graded for completion. This may also include activities on Canvas outsides of class time. Students will need to participate in 85% of assignments (equivalent to ~4 unexcused absences) to receive full credit. In class assignments cannot be made up if missed.

Assignments: Assignments are based around two major pieces of reading, a popular science book and a peer-reviewed research article from the literature. Students will choose one of each from a pool provided by the instructor.

Book Summary: Students will submit a 1-page summary of the book and description of how the book relates to class topics.

Book Presentation: Students who chose the same book will form a group and together present their book to the class based on the schedule below. Presentations should be 30 minutes long and all group members are required to participate. The presentation should teach the class the most important concepts and takeaways from the book. Group members will the lead a discussion on the topic. A draft of the slides will be due to the instructor 1 week before the presentation date.

Literature Paper: Students will read and analyze a paper from the literature that describes a toxicology experiment investigating a toxicant in an organ system. The first half of the paper will describe background information on the toxicant and organ system. The second half of the paper will summarize the experiments performed, including the hypothesis, methods, results, and conclusions. Students registered for 616 will in addition write a critique of the experiments, including strengths, weaknesses, and future direction. Assessments include:

- Outline of the entire paper: 1-2 pages
- Background section: 2 pages not including figures and references
- Literature analysis: 4 pages not including figures and references
- Critique (616 only): 2 pages not including figures and references

Unless otherwise stated, due dates for all assignments are 10 am on Fridays on Canvas. All assignments should be written in size 11 Times New Roman, 1.5 spaced with 1” margins.

POLICIES

Attendance: Attendance in required and will be assessed via in class assignments. Students will need to participate in 85% of in class assignments to receive full credit.

Illness: Please do not come to class if you are sick or think you might be getting sick. Masks are encouraged if you have been exposed to illness.

Makeup Policy: If you need to miss a presentation or major assignment, you must contact the Dean of Students' office with proof of the reason for missing, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the conflict. Do not send personal medical information to the instructor. A note of excuse from the Dean of Students must be presented to the instructor explaining that the presentation will be missed so that appropriate steps can be taken to make up the grade.

Electronic Devices: Lecture slides will be available before lecture begins to facilitate note taking. Laptops and tablets are permitted for note taking and work related to class. Please stay off email, social media, etc. because it is distracting to you and the people sitting around you. All cell phones must be silenced during class.

Diversity, Equity, and Inclusion: This class strives to be an inclusive community, learning from the many perspectives that come from having differing backgrounds and beliefs. As a community, we aim to be respectful to all. We reject all forms of prejudice and discrimination, including but not limited to those based on age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, and veteran status. Faculty and students are expected to commit to creating an environment that facilitates inquiry and self-expression, while also demonstrating diligence in understanding how others' viewpoints may be different from their own.

Statement on Academic Integrity: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is the instructor's professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

ADDITIONAL RESOURCES

Accommodations: This course is intended to be accessible to all students. Please let me know ways to improve the effectiveness of the course for you personally or for other students. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make alternative arrangements.

Office of **A**ccessibility **R**esources and **S**ervices (***formerly known as Disability Support Services***) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability, please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at: http://www5.njit.edu/studentsuccess/disability-support -services/

Important Dates: Spring 2023 Academic Calendar https://www.njit.edu/registrar/spring-2023-academic-calendar

Month	Day		Event
January	16	Monday	Martin Luther King, Jr. Day
January	17	Tuesday	First Day of Classes
January	23	Monday	Last Day to Add/Drop a Class
March	13	Monday	Spring Recess Begins - No Classes
March	18	Saturday	Spring Recess Ends
April	3	Monday	Last Day to Withdraw
April	7	Friday	Good Friday - No Classes
May	2	Tuesday	Friday Classes Meet
May	2	Tuesday	Last Day of Classes
May	3	Wednesday	Reading Day 1
May	4	Thursday	Reading Day 2
May	5	Friday	Final Exams Begin
May	11	Thursday	Final Exams End
May	13	Saturday	Final Grades Due

Course Outline

Date	Reading	Topic	Assignment
1/18	Chapter 1	Introduction, History	
1/20	Chapter 2	Basic Principles	Disasters in class assignment
1/25	Chapter 3	Mechanisms	Discussion responses due
1/27	Chapter 5	Adsorption, Distribution, Excretion	
2/1	Chapter 6	Biotransformation	
2/3	Chapter 7	Toxicokinetics	
2/8	Chapter 9	Carcinogens	
2/10	Chapter 8	Genetic Toxicology	OSF & CD summaries due
2/15	Chapter 10	Developmental toxicology	
2/17		How to read a paper	2/24 presentation drafts due SS & PH summaries due

Tentative - all dates and topics subject to change

2/22	Chapter 21	Endocrine disrupting chemicals	
2/24		Our Stolen Future & Count Down presentations + discussion	3/3 presentation drafts due RG & TR book summaries due
3/1	Chapters 22, 23	Pesticides, metals	
3/3		Silent Spring & Poisoner's Handbook – presentation + discussion	3/10 presentation drafts due
3/8	Chapter 25	Radiation & DNA damage – Dr. Alex Carpenter	
3/10		Radium Girls & Toms River presentations + discussion	
3/22		Guest lecture – topic TBD	
3/24	Chapter 26	Plants & animals	Outline due
3/29	Chapter 30	Ecotoxicology	
3/31		Ecotox guest speaker – Dr. Kylie Rock	
4/5		Manufactured doubt	
4/7		*No class – university holiday*	Background due
4/12	Chapter 32	Forensic toxicology	
4/14		Forensics - guest speaker	
4/19	Chapter 3, 35	Risk assessment and regulatory toxicology	
4/21		EPA guest speaker – Dr. Andrea Hindman	Analysis due
4/26	Chapters 27, 28	Food toxicology	
4/28		FDA guest speaker – Dr. Saniya Rattan (virtual)	
5/2		Special topic / catch up / discussion	