

North Carolina Agricultural and Technical State University
Aggie Digital Collections and Scholarship

Open Educational Resources Syllabus Review

Distance Education and Extended Learning

2020

Environmental and Occupational Toxicology

North Carolina Agricultural and Technical State University

Follow this and additional works at: <https://digital.library.ncat.edu/oerrs>

Recommended Citation

North Carolina Agricultural and Technical State University, "Environmental and Occupational Toxicology" (2020). *Open Educational Resources Syllabus Review*. 64.
<https://digital.library.ncat.edu/oerrs/64>

This Book is brought to you for free and open access by the Distance Education and Extended Learning at Aggie Digital Collections and Scholarship. It has been accepted for inclusion in Open Educational Resources Syllabus Review by an authorized administrator of Aggie Digital Collections and Scholarship. For more information, please contact iyanna@ncat.edu, snstewa1@ncat.edu.



NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIVERSITY

COURSE SYLLABUS

College Name: College of Science and Technology
Department Name: Built Environment
Course Name: Environmental and Occupational Toxicology

COURSE INFORMATION

- Course Number/Section: EHS 315
- Term:
- Semester Credit Hours: 3
- Times and Days:
- Class Location:

INSTRUCTOR CONTACT INFORMATION

- Instructor:
- Office Location:
- Office Phone:
- Email Address:

Faculty must notify students of the approximate time and method they can expect to receive an answer to all communications (e.g., email, phone, course messages). Excluding holidays, the response should be provided within 48 hours.

If there's a graduate teaching assistant assigned to work with this course, please include their names also.

STUDENT HOURS

These are times students may visit the professor without an appointment to request the assistance they need.

NOTE: Students are responsible for reading, understanding, and following the syllabus.

: AM ☐ / PM ☐ – : AM ☐ / PM ☐

Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐

COURSE PREREQUISITES

BIOL 100

COURSE DESCRIPTION

Environmental health is associated with recognizing, assessing, understanding and controlling the impacts of people in their environment and the impacts of the environment on the public health. The science of environmental health spans a wide range of topics, requiring the use of multidisciplinary approaches to study the impact of environmental factors on human health. Toxicology, a major component of environmental health, can be broadly defined as the science that explores how drugs and chemicals adversely affect human health. Student enrolled in this course will learn the basic principles of toxicology as they apply to human health. Topics will include activation and detoxification of drugs and chemicals, cellular and molecular mechanisms involved in toxic responses elicited by chemicals, and basic concepts of carcinogenesis and mutagenesis. Effects associated with specific classes of chemical agents that are likely to induce injury and/or pose significant potential for human exposure will be presented. In addition, the concept of how human risk is estimated from xenobiotic exposure will be introduced.

STUDENT LEARNING OBJECTIVES/OUTCOMES (SLO)

Learning outcomes should be specific, measurable, and focused on the content knowledge the students are expected to master and not what the faculty will teach.

If the course is a General Education Course, the SLO should be listed and labeled as "General Education."

Learning Outcomes:

1. Describe the effects of biological, chemical, and physical hazards on the human body, including the role of genetic factors, pathways and routes of exposure, fate within the body, and adverse health effects
2. Explain the science underlying testing for the ability of chemicals to elicit adverse human health effects.

SLO 1: Communication Skills

Competency 1. Apply writing practices to communicate effectively with professionals in the field.

Assessment Measure: Students will contribute to a discussion board and exchange ideas with their colleagues. The comments will be reviewed and critiqued with an assessment rubric.

SLO 2: Critical Thinking Skills

Competency 1. Analyze and apply quantitative, analytical and mathematical reasoning to solve EHS problems.

Assessment Measure: Students will assess and apply the critical components of a dose response curve.

Competency 2. Communicate logical information and make connections between ideas.

Assessment Measure: Students will make the connection between exposure and disease outcomes using various toxicological techniques

Competency 3. Evaluate and solve technical and managerial problems systematically.

Assessment Measure: Students will be able to explain the requirements of assessing the outcomes of exposure to environmental toxicants and toxins..

SLO 3:Disciplinary Expertise

Competency 1. Demonstrate a good level of understanding of Environmental technology and sustainable practices.

Assessment Measure: Students will be determine the proper instruments needed to assess environmental conditions which can bring about pathological issues.

SLO 4:Research/Creative Engagement

Competency 3. Effectively utilize information technology to research and develop terminal papers, written projects, and other assignments.

Assessment Measure: Students will utilize information technology applications to complete assignments. Students are to engage several formats of media when making presentations. Additionally, all written course assignments are completed and submitted in the course management system. An assessment rubric is used to review and critique assignments.

REQUIRED TEXTBOOKS AND MATERIALS

Any course-level subscriptions and tools linked in Blackboard Learn learning management system (LMS) should be listed here. The Blackboard LMS must have links to their student data privacy statement.

REQUIRED TEXTS:

Klaassen, C. D. (2018). *Casarett & Doull's toxicology: The basic science of poisons* (9th ed.). McGraw-Hill Education / Medical.

REQUIRED MATERIALS:

SUGGESTED COURSE MATERIALS

SUGGESTED READINGS/TEXTS:

Please make sure you read old course materials as you navigate this course to see the real world application of what you learned in the classroom

SUGGESTED MATERIALS:

To succeed in this course you will need a functioning computer with stable internet.

GRADING POLICY

ASSIGNMENTS AND GRADING POLICY

94% and above	A		76% - 74%	C
93% - 90%	A-		73% - 70%	C-
89% - 87%	B+		69% - 67%	D+
86% - 84%	B		66% - 64%	D
83% - 80%	B-		63% - 60%	F
79% - 77%	C+			

For GRADUATE COURSES: See 2019-2020 Graduate Catalog p.38 for graduate grading scale and Non-Graded Courses

GRADING ALLOCATION

Course grades are based on a weighted grading scale of 100%. The breakdown for the course is as follows: *[Faculty, please adjust according to your course.]*

Category	# of Activities	Percentage Grade Weight
Assignments	3	15%
Discussion Boards	8	15%
Class Presentation	1	10%
Exams	3	60%
Total		100%

COURSE POLICIES

USE OF BLACKBOARD AS THE LEARNING MANAGEMENT SYSTEM

Blackboard is the primary online instructional and course communications platform. Students can access the course syllabus, assignments, grades, and learner support resources. Students are encouraged to protect their login credentials, complete a Blackboard orientation, and log in daily to the course.

Note: Uploading assignments through Blackboard presents a challenge for Chromebook users in locating the files for submission. If you use a Chromebook, please be sure you also have access to a Mac computer or Windows computer so you can fully participate in your Blackboard class. For more information about student computer recommendations, please visit <https://hub.ncat.edu/administration/its/computer-recommendations.php>.

MAKE-UP EXAMS

See << Update Academic Year >> *Undergraduate Bulletin*:

<https://www.ncat.edu/provost/academic-affairs/bulletins/index.php>

**For GRADUATE STUDENTS: See 2019-20 Graduate Catalog p. 54
EXTRA CREDIT**

LATE WORK

SPECIAL ASSIGNMENTS

For GRADUATE STUDENTS: FAILING TO MEET COURSE REQUIREMENTS (Graduate Catalog p.40)

For GRADUATE STUDENTS: CLASS ATTENDANCE (see 2019-20 Graduate Catalog p. 53-54)

Students are expected to attend class and participate on a regular basis in order to successfully achieve course learning outcomes and meet federal financial aid requirements ([34 CFR 668.22](#)). Class attendance in online courses is defined as active participation in academically-related course activities. Active participation may consist of course interactions with the content, classmates, and/or the instructor. Examples of academically-related course activities include, but are not limited to:

- Completing and submitting assignments, quizzes, exams, and other activities within Blackboard or through Blackboard (3rd-party products).
- Participating in course-related synchronous online chats, discussions, or meeting platforms such as Blackboard Collaborate in which participation is tracked.

CLASSROOM CITIZENSHIP

Courtesy, civility, and respect must be the hallmark of your interactions.

COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT

North Carolina A&T State University is committed to following the requirements of the Americans with Disabilities Act Amendments Act (ADAAA) and Section 504 of the Rehabilitation Act. If you need an academic accommodation based on the impact of a disability, you must initiate the request with the Office of Accessibility Resources (OARS) and provide documentation in accordance with the Documentation Guidelines at N.C. A&T. Once documentation is received, it will be reviewed. Once approved, you must attend a comprehensive meeting to receive appropriate and reasonable accommodations. If you are a student registered with OARS, you must complete the Accommodation Request Form to have accommodations sent to faculty.

OARS is located in Murphy Hall, Suite 01 and can be reached at 336-334-7765, or by email at accessibilityresources@ncat.edu. Additional information and forms can be found on the internet at <https://www.ncat.edu/provost/academic-affairs/accessibility-resources/index.php>.

Please note: Accommodations are not retroactive and begin once the Disability Verification Form is provided to faculty.

TITLE IX

North Carolina A&T State University is committed to providing a safe learning environment for all students—free of all forms of discrimination and harassment. Sexual misconduct and relationship violence in any form are inconsistent with the university’s mission and core values, violates university policies, and may also violate federal and state law. Faculty members are considered “Responsible Employees” and are required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator. If you or someone you know has been impacted by sexual harassment, sexual assault, dating or domestic violence, or stalking, please visit the Title IX website to access information about university support and resources. If you would like to speak with someone confidentially, please contact Counseling Services at 336-334-7727 or the Student Health Center at 336-334-7880.

TECHNICAL SUPPORT

If you experience any problems with your A&T account, you may call Client Technology Services (formerly Aggie Tech Support and Help Desk) at 336-334-7195, or visit <https://hub.ncat.edu/administration/its/dept/ats/index.php>.

FIELD TRIP POLICIES / OFF-CAMPUS INSTRUCTION AND COURSE ACTIVITIES

If applicable:

Off-campus, out-of-state, foreign instruction, and activities are subject to state law and university policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at <https://www.ncat.edu/campus-life/student-affairs/index.php>.

STUDENT HANDBOOK

<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

STUDENT TRAVEL PROCEDURES AND STUDENT TRAVEL ACTIVITY WAIVER

https://hub.ncat.edu/administration/student-affairs/staff-resources/studen_activity_travel_waiver.pdf

OTHER POLICIES (e.g., Copyright Guidelines, Confidentiality, etc.)

STUDENT HANDBOOK

<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

[Graduate Catalog](#)

SEXUAL MISCONDUCT POLICY

<https://www.ncat.edu/legal/title-ix/sexual-harassment-and-misconduct-policies/index.php>

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

<https://www.ncat.edu/registrar/ferpa.php>

STUDENT COMPLAINT PROCEDURES

<https://www.ncat.edu/current-students/student-complaint-form.php>

STUDENT CONDUCT AND DISCIPLINE

North Carolina A&T State University has rules and regulations that govern student conduct and discipline meant to ensure the orderly and efficient conduct of the educational enterprise. It is the responsibility of each student to be knowledgeable about these rules and regulations.

Please consult the following about specific policies such as academic dishonesty, cell phones, change of grade, disability services, disruptive behavior, general class attendance, grade appeal, incomplete grades, make-up work, student grievance procedures, withdrawal, etc.:

- Undergraduate Bulletin
<https://www.ncat.edu/provost/academic-affairs/bulletins/index.php>
- Graduate Catalog
<https://www.ncat.edu/tgc/graduate-catalog/index.php>
- Student Handbook
<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

ACADEMIC DISHONESTY POLICY

Academic dishonesty includes but is not limited to the following:

1. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty;
2. Plagiarism (unauthorized use of another's words or ideas as one's own), which includes but is not limited to submitting exams, theses, reports, drawings, laboratory notes or other materials as one's own work when such work has been prepared by or copied from another person;
3. Unauthorized possession of exams or reserved library materials; destroying or hiding source, library or laboratory materials or experiments or any other similar actions;
4. Unauthorized changing of grades, or marking on an exam or in an instructor's grade book or such change of any grade record;
5. Aiding or abetting in the infraction of any of the provisions anticipated under the general standards of student conduct;
6. Hacking into a computer and gaining access to a test or answer key prior to the test being given. N.C. A&T reserves the right to search the emails and computers of any student suspected of such computer hacking (if a police report of the suspected hacking was submitted prior to the search); and
7. Assisting another student in violating any of the above rules.

A student who has committed an act of academic dishonesty has failed to meet a basic requirement of satisfactory academic performance. Thus, academic dishonesty is not only a basis for disciplinary action, but may also affect the evaluation of a student's level of performance. Any student who commits an act of academic dishonesty is subject to disciplinary action.

In instances where a student has clearly been identified as having committed an act of academic dishonesty, an instructor may take appropriate disciplinary action, including loss of credit for an

assignment, exam, or project; or awarding a grade of “F” for the course, **subject to review and endorsement by the chairperson and dean.**

For GRADUATE STUDENTS: Reference for academic dishonesty – 2010-2020 Graduate Catalog, p.58-59

For GRADUATE STUDENTS: STUDENT RELIGIOUS OBSERVANCE (see Graduate Catalog, p.55)

ASSIGNMENTS AND ACADEMIC CALENDAR

Include topics, reading assignments, due dates, exam dates, withdrawal dates, pre-registration and registration dates, all holidays, and convocations.*

THE WEEK OF MM/DD/YY	SUBJECT	UNIT LEARNING OUTCOMES (ULO)	READING IN TEXT, ACTIVITY, HOMEWORK, EXAM
	Module 1: Course Introduction, History of Toxicology, Principles of Toxicology	ULO 1: Explain the concept of dose and its role in human health outcomes. (SLO 1) ULO 2: Describe how chemicals interact with each other. (SLO 1)	1. Read Textbook: Klaassen, C. D. (2018). <i>Casarett & Doull's toxicology: The basic science of poisons</i> (9th ed.). McGraw-Hill Education / Medical. a. Chapters 1 and 2 2. Complete: Discussion Board #1: Self Introduction
	Module 2: Mechanisms of Toxicity: Absorption, Distribution, and Excretion	ULO 1: Describe the mechanisms of toxicity as they apply to human health. (SLO 1-2) ULO 2: Distinguish critical events that happen during Absorption, Distribution, and Elimination (ADE).(SLO 1-2)	1. Complete: Discussion Board #2: Additive effect, synergistic effect, potentiation, and antagonism
	Module 3: Biotransformation of Xenobiotics I & II	ULO 1: Describe the difference between phase I and phase 2 enzymes. (SLO 1-2) ULO 2: Explain the role of Cytochrome P450 in metabolism. (SLO 1)	1. Read Textbook: Curtis Klaassen. Casarett & Doull's Toxicology(2018). <i>The Basic Science of Poisons, 9th Edition</i> , McGraw-Hill Education / Medical. a. Chapter 6: Biotransformation of Xenobiotics. 2. Complete: Discussion Board#3: Bio Transformation for Acetaminophen (ULO 1-2)

Module 4: Chemical Carcinogenesis and Genetic Toxicology	<p>ULO 1: Describe the three stages of carcinogenesis and critical components of each stage. (SLO 1-2)</p> <p>ULO 2: Describe the assays that detect genotoxicity and mutagenicity. (SLO 1-2)</p>	<ol style="list-style-type: none"> 1. Read Textbook : Curtis Klaassen. Casarett & Doull's Toxicology(2018). <i>The Basic Science of Poisons, 9th Edition</i>, McGraw-Hill Education / Medical. <ol style="list-style-type: none"> a. Chapter 8: Chemical Carcinogenesis b. Chapter 9: Genetic Toxicology 2. Complete: Assignment #1: Environmental and occupational Toxicants (ULO 1-2) 3. Complete: Discussion Board #4: Toxicology in an Occupational Setting (ULO 1-2)
Module 5: Risk Assessment	<p>ULO 1: Describe the four steps of a risk assessment and the type of data needed for each step. (SLO 1-2)</p> <p>ULO 2: Compare and contrast RfD, RfC, CSF. (SLO 1-2)</p> <p>ULO 3: Describe the difference between variability and uncertainty. (SLO 1-2)</p>	<ol style="list-style-type: none"> 1. Read Textbook : Curtis Klaassen. Casarett & Doull's Toxicology(2018). <i>The Basic Science of Poisons, 9th Edition</i>, McGraw-Hill Education / Medical. <ol style="list-style-type: none"> a. Chapter 4: Risk Assessment 2. Complete: Discussion Board #5: Toxicology and Risk Assessment (ULO 1-3) 3. Complete: Exam #1 (All ULOs Module 1-4)
Module 6: Toxic Responses: Immune, Skin and Liver	<p>ULO 1: Explain the difference between apoptosis and necrosis. (SLO 1-2)</p> <p>ULO 2: Describe pathological processes that occur in the liver. (SLO 1-2)</p>	<ol style="list-style-type: none"> 1. Read Textbook : Curtis Klaassen. Casarett & Doull's Toxicology(2018). <i>The Basic Science of Poisons, 9th Edition</i>, McGraw-Hill Education / Medical. <ol style="list-style-type: none"> a. Chapter 12: Toxic Responses of the Immune System b. Chapter 13: Toxic Responses of the Liver c. Chapter 19: Toxic Responses of the Skin 2. Complete: Discussion Board #6: Transformation Reactions

			for Xenobiotics (ULO 2)
	Module 7: Toxic Responses: Kidney/Heart/Cardiovascular	<p>ULO 1: Describe the mechanisms of chemically induced acute renal failure. (SLO 1-2)</p> <p>ULO 2: Explain the ways in which cardiovascular toxicants alter different portions of the cardiovascular system. (SLO 1-2)</p>	<p>1. Read Textbook : Curtis Klaassen. Casarett & Doull's Toxicology(2018). <i>The Basic Science of Poisons, 9th Edition</i>, McGraw-Hill Education / Medical.</p> <p>a. Chapter 14: Toxic Responsive of the Kidney</p> <p>b. Chapter 18: Toxic Responses of Heart and Vascular System</p> <p>2. Complete: Discussion Board Board #7: Toxicants and Alteration of Cardiovascular System. (SLO 1-2)</p>
	Module 8: Lung/Reproductive Toxicology	<p>ULO 1: Describe Lung Pathogenesis and the role of oxidative stress. (SLO 1-2)</p> <p>ULO 2: Explain the health outcome to the developing fetus of exposure to environmental toxicants on a developing fetus. (SLO 1-2)</p>	<p>1. Read Textbook : Curtis Klaassen. Casarett & Doull's Toxicology(2018). <i>The Basic Science of Poisons, 9th Edition</i>, McGraw-Hill Education / Medical.</p> <p>a. Chapter 10: Developmental Toxicology</p> <p>b. Chapter 15: Toxic Responses of the Respiratory System</p> <p>c. Chapter 21: Toxic Responses of the Reproductive System</p> <p>2. Complete: Discussion Board #8: Effects a teratogen During Pregnancy. (ULO 2)</p>
	Module 9: Toxic Responses: Endocrine	<p>ULO 1: Describe the mechanism by which various endocrine disruptors affect normal physiological function. (SLO 1-2)</p> <p>ULO 2: Explain the differences between the known classes of endocrine disruptors. (SLO 1-2)</p>	<p>1. Complete: Assignment #2: Environmental Toxicants and Disorders. (ULO 1-2)</p>

	Module 10: Plant and Animal Toxins Ecotoxicology	<p>ULO 1: Describe how plant toxins affect various organ systems. (SLO 1-2)</p> <p>ULO 2: Describe how animal toxins affect various organ systems. (SLO 1-2)</p>	1. Complete: Exam #2 (All ULOs Unit 5-9)
	Module 11: Air Pollutants, Food Toxicology and Toxic Effects of Calories	<p>ULO 1: Describe the role of particulate matter in respiratory health. (SLO 1-2)</p> <p>ULO 2: Explain how food can serve as a toxicant. (SLO 1-2)</p>	1. Complete: Discussion Board #9 : Toxicants and Alteration in the Cardiovascular System (ULO 1-2)
	Module 12: Class Presentation	ULO 1: Explain the environmental disaster that occurred and describe issues that played a role in it occurring. (SLO 1-2)	1. Complete: Class presentation (ULO 1)
	Module 13: Occupational Toxicology, Analytic/Forensic/Clinical Toxicology	<p>ULO 1: Explain the various exposure limits and which ones are enforced by the government. (SLO 1-2)</p> <p>ULO 2: Describe the most common source of occupational exposures and how to mitigate them. (SLO 1-2)</p>	1. Complete: Discussion Board #10: Effects of Teratogen during Pregnancy (ULO 1)
	Module 14: Nanotoxicology, Regulatory Considerations	<p>ULO 1: Describe the role nanotoxicology plays in occupational health. (SLO 1-2)</p> <p>ULO 2: Compare and contrast the specimens used for human drug testing. (SLO 1-2)</p> <p>ULO 3: Describe the different phases of acetaminophen toxicity. (SLO 1-2)</p>	<p>1. Read Textbook : Curtis Klaassen. Casarett & Doull's Toxicology(2018). <i>The Basic Science of Poisons, 9th Edition</i>, McGraw-Hill Education / Medical.</p> <p>a. Chapter 32: Analytical and Forensic Toxicology</p> <p>b. Chapter 33: Clinical Toxicology</p> <p>c. Chapter 34: Occupational Toxicology</p> <p>2. Complete: Assignment #3: Food Toxicity and Chemical Exposure (ULO 1-2)</p>

	Module 15: Assessing adverse human health effects	<p>ULO 1: Compare and contrast the specimens used for human drug testing. (SLO 1-2)</p> <p>ULO 2: Describe the different phases of acetaminophen toxicity. (SLO 1-2)</p>	1. Complete: Exam #3 (All ULOs Unit 10-15)
--	--	--	---

** These descriptions and timelines are subject to change at the discretion of the instructor.*