Aquatic Toxicology: Science and Applications
SWS 4504

3 credit hours – Spring Semesters

Instructor: P. Chris Wilson
Office: 3167 McCarty Hall A
Office phone: 352-294-3166
Email: pcwilson@ufl.edu

Office hours: Open door policy (If not regularly on my hallway, email for availability before coming or for appointment)

Course location: McCarty Hall B, Room 3124
meeting times: Weekly lectures on Canvas
Weekly Chat Sessions Fridays, 11:45 am

CATALOG DESCRIPTION: Introduces foundational knowledge and concepts of the field of aquatic toxicology. Examines how environmental and chemical properties influence the fate and bioavailability of contaminants in aquatic environments; introduces principles of toxicology and methods used to study aquatic toxicology, as well as applications of knowledge gained from aquatic toxicology studies.

COURSE OBJECTIVES: Students will develop foundational knowledge needed to understand this multi-disciplinary field. After completing this course, students will:

- be familiar with how the unique, dynamic properties of chemicals and the environment influence the fate and bioavailability of contaminants in the aquatic environment.
- be able to identify why some contaminants are toxic while others are not.
- be familiar with how to design toxicity tests based on data needs
- gain experience applying lessons learned (previous objectives) for evaluating risks to aquatic organisms.

DELIVERY METHOD: Hybrid course. Online lectures with weekly face-to-face meetings during 1 class period each week. Online lectures (powerpoint presentations) and other course materials delivered through the Canvas E-Learning System.

PRE-REQUISITES/CO-REQUISITES:
BSC 2005 & BSC 2005L or BSC 2010 & BSC 2010L
CHM 2045 & CHM 2045L
CHM 2046 & CHM 2046L
Or with consent from instructor

LECTURE SCHEDULE:

Week	Lecture	Topic	Quiz
Introductory materials			
1	1	Course introduction/Historical perspectives	
	2	Historical Perspectives	
	3	Brief introduction to aquatic toxicology	x
Factors affecting exposures			

2	4	Chemical factors affecting exposures	
	5	Chemical factors affecting exposures	
	6	Environmental (aquatic) factors affecting exposures	x
3	7	Exam 1	
Contaminants and toxicants			
	8	Toxic agents and contaminants	
	9	Toxic agents and contaminants	
Principles of toxicology			
4	10	Bioavailability	
	11	Bioavailability	
	12	Basic toxicological concepts and principles	x
5	13	Basic toxicological concepts and principles	
Uptake and elimination of contaminants			
	14	Uptake of Contaminants	
	15	Elimination of contaminants/bioaccumulation/bioconcentration	x
		Phase I metabolism	
6	16	Overview of Molecular aspects, activation-detoxification, and biomarkers	
	17	Phase I biotransformations-CYP450's	
	18	CYP450 regulation and inducibility	x
7	19	Other Phase I biotransformations	
	20	Exam 2	
	21	Phase II biotransformations	
8	22	Sequestration	x
Toxicity: modes-of-action			
	23	Oxidative stress and antioxidant response	
	24	Enzyme dysfunction and substrate pool shifts	
9	25	Stress proteins	x
	26	DNA modification	
	27	Effects on cells, tissues, and organs	
10	28	Exam 3	
	29	Contaminant-induced sublethal effects	
Methods used in aquatic toxicology			
	30	Organisms for aquatic toxicity testing	
11	31	Organisms for aquatic toxicity testing	
	32	Toxicity testing-introduction, test design, exposure systems	x
	33	Toxicity testing-introduction, test design, exposure systems	
12	34	Toxicity testing-introduction, test design, exposure systems	
	35	Factors affecting quantitative responses/sediment	x
	36	Quantitative estimators of effects	
13	37	Exam 4	
	38	Effects on populations	

	39	Effects on communities and ecosystems	
Applications of toxicity data for ecological risk assessment			
14	40	Ecological risk assessment	x
	41	Ecological risk assessment	
	42	*Graduate student presentations/Case studies	
15	43	Review for final exam	

STUDENT ASSESSMENT:
1. You are expected to attend and be prepared to participate in all class sessions. A portion of the grade is based on meaningful class participation, demonstrated student interest, and overall student dedication.

2. Assessments are based on exams, quizzes, and participation in class.

3. Course grades will be determined as follows (%):
Undergraduate students

Evaluation endpoint	Frequency	% of total grade
Participation	Weekly	5
Quizzes and assignments	As announced	10
Exams	4	60
Final exam	1	25

Grading Scale

A	93% and above	C	73-76.99%
A-	90-92.99%	C-	70-72.99%
B+	87-89.99%	D+	67-69.99%
B	83-86.99%	D	63-66.99%
B-	80-82.99%	D-	60-62.99%
C+	77-79.99%	E	Below 60

Current UF grading policies for assigning grade points may be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

ATTENDANCE AND CONDUCT: Students should be ready to begin class as soon as the scheduled start time is reached (i.e. arrive early). Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx. Cell phones should be silenced during class.

COMMUNICATION. Students are encourage to always ask questions during class regarding subject material, assignments, etc. that they do not understand so that others may also benefit. Questions and discussions about personal issues (e.g. grades, make-up work, etc.) should take place one-on-one before/after class, during office hours, or by email.

REQUIRED BOOK: *An Introduction to Aquatic Toxicology* (Mikko Nikinmaa, 2014) ISBN 978-0-12-411574-3.

RECOMMENDED BOOKS: Additional texts that may be useful include: *Fundamentals of Aquatic Toxicology* (Gary Rand ed., 1995) and *Fundamentals of Ecotoxicology* (Michael Newman 2015 or earlier). Additional handouts and references to specific topics may be given during the semester.

COURSE FEEDBACK AND EVALUATION: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES: If you require classroom accommodation because of a disability, you must first register with the Disability Resource Center (352-392-8565; www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, you will receive an accommodation letter that must be presented to the instructor when requesting accommodation. The College is committed to providing reasonable accommodations to assist students in their coursework. Students needing accommodations should request them as early as possible in the semester.

ACADEMIC HONESTY: UF students are bound by The Honor Pledge, which states, " We, the members of the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity by abiding by the Honor Code." On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class.

SOFTWARE USE: All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

CAMPUS RESOURCES

Students may occasionally have personal issues that arise in the course of pursuing higher education or that may interfere with their academic performance. If you find yourself facing problems affecting your coursework, you are encouraged to talk with an instructor and to seek assistance from appropriate University resources.

Health and Wellness

U Matter, We Care

If you or a friend is in distress, please contact umatter@ufl.edu or 352-392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center

http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575; and the University Police Department: 392-1111 or 911 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

The Student Health Care Center
Primary and specialty health care. http://shcc.ufl.edu/.

Alachua County Crisis Center
Crisis intervention is always available 24/7: (352) 264-6789.

Academic Resources

E-learning technical support
352-392-4357 (select option 2) or email to Learning-support@ufl.edu.
http://lss.at.ufl.edu/help.shtml.

Career Resource Center
Reitz union, 392-1601. Career assistance and counseling. http://www.crc.ufl.edu.

Library Support
http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center
Broward Hall, 392-2010 or 392-6420. General skills and tutoring. http://teachingcenter.ufl.edu.

Writing Studio
302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
http://writing.ufl.edu/writing-studio/.

Student Complaints
Campus: https://www.dso.ufl.edu/documents/UF_Complaints_Policy.pdf.
On-Line Students: http://www.distance.ufl.edu/student-complaint-process.