11:115:436 - Molecular Toxicology Laboratory - Offered in Spring semester

Instructors: Office Hours: Arranged via email

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Course Objective: The objective of this class it to acquaint students with current laboratory techniques used in toxicological research. In doing so, this class will emphasize critical thinking and will focus on hypothesis-based science. By the end of the course, students should be able to ask a relevant toxicological question, design an experiment, perform the experiment, analyze the data, and answer specific written responses to questions. Also, you must present a 30minute presentation on the toxicology of a specific agent (to be provided) covering the areas discussed in lab. Specific topics include:

- Principles of toxicology – developmental toxicology, molecular toxicology, genetic toxicology, carcinogenesis, models for toxicity testing, metabolism
- Experimental design, statistical analysis, and critical assessment of research papers
- Data representation and interpretation
- Scientific writing and presentation

The specific dates of each lecture are posted on the canvas site, near the beginning of the semester.

Date:	Topic:		Assignments:
	Introduction/Ecotoxicology	A description of the course, and Ecotoxicology Lecture	
	Different Model Systems and endpoints in Toxicology. (rodents, Zebrafish and others)	Learn about traditional and non-traditional model systems and the Adverse Outcome Pathway (AOP) concept.	Due: Question Set 1 (Ecotoxicology)
	Statistics, Risk Assessment and Data Analysis (Dose response)	Practical statistics and analysis along with looking at Risk Assessments.	Due: Question Set 2 (Model Systems)
	Necropsies, Histology and Pathology	How to identify lesions and prepare tissue for analysis	Due Question Set 3 (Data Analysis)
	Microscopy Techniques VD	Confocal Analysis/Microscopy (Research Tower)	
	SPRING BREAK		
	Zebrafish Model	Development and lesion occurrence	
	Molecular Toxicology	RNA Isolation and RT-PCR	Due: Question Set 4 (Histo. & Gross obs.)
	Cyp450 assays/ Ultracentrifugation	Cyp1a qPCR, Protein Isolation, EROD Activity Assay	
	Data Analysis	qPCR, EROD Activity	
	In Vitro Methods and Genotoxicity	Modified Ames Mutation Assay & Resistance Development	Due: Question set 5 (Levels/Activity)
	Student Presentations: Power Point	Toxicant going from Physical Chemical Properties to risk assessment both human and ecological species	

Grading: Total = 200 points

Questions = 5 question Sets each 25 pts for a total of 125 points
Class Participation: 15 points
Risk Characterization for in class presentation: 60 points

Assignments: The laboratory schedule lists the due dates for all assignments. All assignments will be submitted via the Canvas portal. Assignments are due by the start of the lab periodof the day it is due. **No late assignments will be accepted.** Each student will be given a compound that they will research on their own to assess the literature for effects looking at animal studies, human studies, toxicology studies and mechanism studies. This will be the basis for your presentation on this compound. And if there are recommended limits for the compound you must explain how they were derived based on which studies.

General Conduct: Students are expected to come to class prepared, having read the provided materials and completed any required calculations. If we are in the lab the following applies. The use of cells phones and beepers is not permitted; please switch all phones to silent. Students are to follow the accompanying list of laboratory rules labeled "Laboratory Rules and Guidelines". Please pay special attention to the dress code. Food is permitted in the classroom portion only; feel free to bring something to eat. Because this is a toxicology laboratory and we will be handling hazardous chemicals, gloves, lab coats, and eye protection is required. Please also dispose of chemicals and reagents in their designated areas.

Attendance: Attendance to class is required. Given the nature of the class and the specific timings required for each experiment, there will be no makeup labs. Any unexcused absences can only be excused by a letter from the Deans office. 20 points will be deducted per absence. Students will still be expected to obtain any data and complete all assignments.

Lateness: Lateness will result in point deductions from the lab performance grade. You will still be expected to obtain any data and complete all assignments.

Academic Integrity and Plagiarism: 100% adherence to the Rutgers academic integrity policy is expected. Please visit http://studentconduct.rutgers.edu/ to view the entire policy. Violations of academic integrity will not be tolerated. Plagiarism, in particular, is a growing problem and is defined as the appropriation of someone else's work without proper attribution. For the purposes of this class and for scientific writing in general, the rules on plagiarism are even stricter. While discussion is encouraged, all submitted work must be your own. The purpose of the lab reports and the weekly assignments is for us to gauge *your* understanding and *your* knowledge; therefore, *you* must be "heard" through what you write. Therefore, in some cases, paraphrasing and citing is not necessarily enough. If you are at all unclear about whether something would appear as being plagiarized please do not hesitate to ask. Acts of plagiarism will result in a zero grade.