Protein Toxins Syllabus Spring 2023

Class Schedule:

Week	Date	Lecture Topic	Guidebook Chapter	Due Dates	Discussion Activities
1	3-Apr	Introduction	preface		
	5-Apr	Cholera Toxin / Pertussis Toxin	2		
2	10-Apr	Diphtheria Toxin / Ricin	3		
	12-Apr	Anthrax LF and EF	5		
3	17-Apr	*Discussion 1*			Science Paper Styles
	19-Apr	Botulinum Neurotoxin	6		Online web assignment
4	24-Apr	*Tetanus Neurotoxin*	6		
	26-Apr	Snail/Spider Toxins	9		
5	1-May	AChR Toxins	10	**Midterm 1**	
	3-May	PLA2 and latrotoxin	12		
6	8-May	Glycerotoxin and Invasins	12		
	10-May	*Discussion 2*			Papers #2-6
7	15-May	Helicobacter toxins		**Midterm 2**	
	17-May	*Discussion 3*			individual presentations
8	22-May	*Discussion 4*			
	24-May	*Discussion 5*		**Abstract for Final**	individual presentations
9	29-May	**Memorial Day**			individual presentations
	31-May	*Discussion 6*			individual presentations
10	5-Jun	*Discussion 7*			individual presentations
	7-Jun	*Discussion 8*			individual presentations + proposals
11	9-Jun	(this is different from the scheduled final)		**Final Exam**	

Instructor:

Philip Washbourne pwash@uoregon.edu

Office hours:

Tuesdays 4-5 pm, Will 176

or by appointment

Suggested prerequisites:

Either Cell Biology 322 or Neurobiology 360

Course Description and Goals:

This course investigates the mechanisms used by protein toxins to kill or debilitate humans and other animals and how they have been used as molecular scalpels to dissect important questions in cell and neurobiology. Bacterial pathogens, predatory animals and prey have devised toxins to kill or defend themselves from being killed.

These toxins have been studied in order to treat humans against these medical challenges. The research has led, however, to understanding fundamental questions of cell and neurobiology such as neurosecretion, membrane trafficking, synapse formation and membrane channel properties. Toxins covered include tetanus toxin, botulinum neurotoxin (Botox), anthrax, cholera toxin, various snake toxins and ricin. This course not only aims to inform students of mechanisms involved in these kinds of intoxication, but hopes to show how using toxins as molecular tools can greatly advance cell biology and neuroscience.

Course requirements:

Students are required to attend class, to read the assigned material and to participate in class discussions. There will be the same number of scientific papers to read as there are students in the class. All students are expected to read all papers of presenters from their discussion group. Each student will present a scientific paper within a discussion class. There will be two graded mid-term research essays, graded preparation of the final and a graded take-home final exam.

Reading:

In addition to the assigned primary papers, reviews (on Blackboard) and chapters in **Protein Toxins and their Use in Cell Biology,** Rappuoli and Montecucco (Editors), Oxford University Press, will be assigned.

Chapters will be provided in Canvas.

Class Schedule:

Each week there will be two 1.5 hour classes (in person).

Discussion classes will use primary scientific papers to understand a toxin and/or its involvement in a facet of cell biology or neuroscience.

Exams:

2.5 Midterms: Take home essay

Final Exam: Take-home essay

For their final exam, graduate students must choose a toxin and describe how they would use it in a novel experiment to understand some aspect of cell biology. This will be a written paper and presented to the class.

Student workload expectations:

Inside class:

- Attend class lecture
- Participate in discussions and class activities

- Present a paper from primary literature

Outside class:

- Reading textbook and primary literature (5 hrs per week)
- Preparing class presentation or research paper (1 hr per week)
- Write and present an original research proposal (grad students; 2hrs per week)

Basis for Grading:

Undergraduate:

- Midterms (incl. Final prep): 40%
- Class Presentation: 20%
- Final: 20%
- Participation: 10%
- End-of-class tests 10%

Graduate:

- Midterms (incl Final prep): 35%
- Research Proposal Presentation: 10%
- Class presentation: 15%
- Final: 20%
- Participation: 10%
- End-of-class tests: 10%

Presentations:

The goal of the presentations is to get students used to reading, understanding, summarizing and presenting research papers. The presentations will be graded based on the following:

Flow	5 pts	clarity of presentation and use of audio-visual media
Intro	5 pts	understanding of the overall question / hypothesis
Results	5 pts	understanding of the techniques used and of the results obtained
Conclusions	5 pts	understanding of the impact and scope of the study

Graduate vs Undergraduate Workload:

Graduate students write a research proposal paper for their final exam. They also present their research proposal to the class. This presentation is in addition to a paper presentation.

COVID-19 Policy

This class is in person. All present should be vaccinated and boosted per UO policies. Masks are appreciated. I will not wear a mask while lecturing, but may wear a mask in closer settings, eg office hours. If you test positive, have close interaction with someone who tests positive or if you start showing symptoms please refrain from coming to class to protect others. Here are links to the UO COVID-19 Safety Resources, a symptom self-check and a list of symptomsLinks to an external site..

Professional Conduct.

You are expected to follow the student conduct code; academic dishonesty includes cheating, plagiarizing or knowingly supplying false information. If you are aware of academic dishonesty occurring, please contact me.

Students with Disabilities.

The University of Oregon is working to create inclusive learning environments. Please notify me if there are aspects of the instruction or design of this course that result in disability-related barriers to your participation. You are also encouraged to contact the Accessible Education Center in 360 Oregon Hall at 541-346-1155 or uoaec@uoregon.edu.