University of Regina Biology 410: Microbial Genetics and Infection

Fall 2024 Wednesday and Fridays 8:30 - 9:45 CL 312

This course will examine bacterial and viral genetic systems. Topics include gene regulation, gene transfer, mutation, evolution of host-pathogen interactions, and epidemiology.

Instructor: Dr. Andrew Cameron
Office: RIC 323
Phone: 306-737-7091
Email: andrew.cameron@uregina.ca
Office hours: by arrangement

Online Resources: A UR Courses site will be provide course materials and will host a discussion forum. Login at https://urcourses.uregina.ca/login/index.php using your uregina.ca username and password.

Reading: "The Selfish Gene" by Richard Dawkins. Oxford University Press
Any Edition. ex: 30th Anniversary edition (paperback) ISBN: 978-0-19-929115-1

Evaluation item	Important dates	%	
Grant proposal		25	
Lay summary	Due October 11		5
Proposal	Due November 22		15
Response to review	Due December 13		5
Book chapter review	Submit before Nov 30	5	
Book club attendance & participation	In class	5	
Collaborative journal club questions (x 4)	In class	20	
Journal club attendance		5	
Presentation		10	
Exam 1	November 1	20	
Exam 2	December 6	10	
Course total		**100**	

Please note that this course falls under the Academic Regulations of the University of Regina and the Faculty of Science (these regulations are printed in the General Calendar, available at www.uregina.ca/gencal/ugcal/).

Grant lay summary & proposal: You will compose a grant proposal to practice this critical form of scientific communication used in academia, industry, and government. The first step is to compose a "lay summary" that is an abstract in plain, accessible language that introduces the reader to the importance of the research topic and how you propose to study it. The lay summary is due October 11. You will compose a grant proposal to develop and showcase your scientific thinking as a series of hypotheses, proposed experiments, and predicted outcomes. Any topic in bacterial or viral genetics is open to you, and will be selected in consultation with Dr. Cameron. Format specifications will be provided in class.

Response to review: Students will receive feedback on their proposal, after which they will compose a short response to the review, addressing points and questions raised during review.

Book club: In book club, we will have a round table discussion of two chapters from the Selfish Gene.

Book chapter review: Each student is responsible for selecting a chapter from the book (other than the five chapters discussed in class) and writing a short review (1-2 pages) including critique and analysis of the chapter's themes and the logic presented. The chapter review can be submitted at any time before Nov 30.

Journal club: On four occasions, a published scientific paper will be assigned as reading. We will meet one week later to work through questions based on the paper. Students will be randomly assorted into small break-out groups (2-3 students) to work collaboratively during class time to answer the questions. Each student will submit their answer sheet through UR Courses by 6 PM that day.

Oral presentation: Each student will deliver a 15-minute presentation to describe and analyze a scientific paper of their choice. The topic can be about anything in microbial genetics/genomics; it can be related to your grant proposal, or can be completely unrelated. You are encouraged to consult with Dr. Cameron regarding good papers for presentation. The presentations will happen as four presentations per day. A marking rubric will be provided. Students are strongly encouraged to ask questions and contribute to discussion in the presentation sessions.

Policies and Procedures for Exams: Exams will be conducted in person. They will consist primarily of short answer questions.

Students who miss either of the two exams must provide a valid explanation with documentation to be reviewed by the Associate Dean Academic.

Special Accommodations: Students in this course who may have need for specialized accommodations should please discuss these accommodations with the instructor and also contact the Centre for Student Accessibility at UofR in Regina (Riddell Centre 251, 306-585-4631).

Course schedule

Week	Wednesday Lectures 8:30-9:45	Friday Discussions & lectures 8:30-9:45	Due dates
Sept 4	General intro and review	Influenza genetics, Mpox	
Sept 11	Microbial genomes	Book club **(Ch 1 & 2)**	
Sept 18	Addiction modules and selfish genetic elements	Book club **(Ch 3)**	
Sept 25	Mutations	Journal club discussion	
Oct 2	Phylogenetics and epidemiology	Mobile genetic elements and horizontal gene transfer	Lay summary due Oct 4
Oct 9	Antimicrobial resistance	Journal club discussion	
Oct 16	Reading week		
Oct 23	Chromosome and plasmid replication and partition	Book club **(Ch 11 & 12)**	
Oct 30	Regulation of gene expression and transcriptional networks	**Exam 1**	
Nov 6	Two component systems & quorum sensing	Journal club discussion	
Nov 13	RNA regulators and attenuation	Journal club discussion	
Nov 20	Genetic studies of host-pathogen interactions	Presentations	Grant proposal due Nov 22
Nov 27	Presentations	Presentations	Book chapter review due Nov 30
Dec 4	Presentations	**Exam 2**	

Readings for journal club will be provided on URCourses.