Course Title: Biosci 780
Experimental Microbiology

Credits: 4 credits

Prerequisite: Admission to the Graduate Program in Biological Sciences or consent of the instructor

Instructor	**Office**	**Email**	**Office hours**
Ching-Hong Yang	Lap 131D	chyang@uwm.edu	Thursday 2-3 p.m. (Yang Section)
Sergei Kuchin	Lap 444	skuchin@uwm.edu	Thursday 2-3 p.m. (Kuchin section)

Class meetings times and location:

Online Web

Course Description:
This course will cover two broad areas (Host-microbe interaction and Microbial genetics) of Experimental Microbiology, each taught by a different professor. This course provides fundamentals of classical and molecular genetics of eukaryotes using yeast as a model organism. It also provides an in-depth overview of how microbes sustain themselves within host organisms on a molecular and cellular level. Along with lab reports and exams, students will need to present scientific papers related to molecular genetics and host-microbe interaction (papers that were published within the past five years) in the class. There is no required textbook for BioSci 780. Scientific papers relating to the microbial genetics and host-microbe interaction will be assigned to the class.

Couse objectives: Upon completion of this course, the student will be able to:

1. Understand the technologies of the yeast two-hybrid system and how to analyze domain structure of proteins and structure-function relationships.
2. Understand the technology of recombinant strain construction and analysis.
3. Learn the fundamentals of statistical analysis of research data.
4. Learn different virulence factors that are involved in host-microbe interaction. Hand on operation of instruments on detecting gene expression.
5. Prepare and deliver oral presentations from scientific papers assigned. Learn how to manage time on paper presentation and engage in discussion.

Credit hour policy:
This 4-credit course meets for 2 hours of lecture and 6 hours of laboratory per week during the semester. This is a 4-credit course, and the expected time commitment from students is approximately 192 hours. Although the exact breakdown will vary by student and by week, our expectation is that students will spend approximately 50% of the time reading and reviewing lecture notes, assigned readings and exam materials; 10% of the time on Power Point presentation; 30% of the time on lab reports; and 10% of the time on quantitative data homework (listed as Exam 4).

Class schedule:
Jan 26
Thursday:
A) Lecture: Host –microbe interactions.

Jan 31

Tuesday:
A) Lab #1: What happen to my rotten potato? Pectinase activity assay I.

Feb 2
Thursday:
A) Lecture: Lecture: Enterobacterial plant pathogens/Pectate lyases and the regulation part 1.
B) Lab #2: What happen to my rotten potato? Pectinase activity assay II

Feb 7
Tuesdays:
A) Introductory of fluorescence-activated cell sorter (FACS).
B) Lab #3: Kinetics of *Dickeya dadantii* Pectinase (Quantitative assay).

Feb 9
Thursday:
A) Lecture: Pectate lyases and the regulation part 2
B) Lab #4: Lab: Detection of transcriptional activities of pel and T3SS genes of *D. dadantii* grown in media and plants

Feb 14
Tuesday:
A) Lecture: Regulatory components of pectate lyases and type III secretion system
B) Lab #4: Lab: Detection of transcriptional activities of pel and T3SS genes of *D. dadantii* grown in media and plants

Feb 16
Thursday:
A) Lecture: Regulatory components of pectate lyases and type III secretion system
B) Lab #5: Virulence assays of *gacA* and *hrpY* mutants in Chinese cabbage; To check the effect of *gacA* and *hrpY* mutants on T3SS and *pel* genes of *Dickeya dadantii* by FACS; Pel plate assay of *gacA* and *hrpY* mutant

Feb 21
Tuesday:
A) Lecture: Regulatory components of pectate lyases and type III secretion system
B) Lab #5: Virulence assays of *gacA* and *hrpY* mutants in Chinese cabbage; To check the effect of *gacA* and *hrpY* mutants on T3SS and *pel* genes of *Dickeya dadantii* by FACS; Pel plate assay of *gacA* and *hrpY* mutant

Feb 23
Thursday:
A) Lecture: The second messenger Cyclic Di-GMP.
B) Lab #6: Effect of *ecpC* mutant on T3SS gene expression, Pel activities and swimming activities of *Dickeya dadantii.*

Feb 28
Tuesday:

A) Lecture: The second messenger Cyclic Di-GMP; Overview and discussion.
B) Lab #6: Effect of *ecpC* mutant on T3SS gene expression, Pel activities and swimming activities of *Dickeya dadantii.*

March 2, completed between 8 am -11 pm, 1.5 hours.
Thursday:
A) Exam 1. Online; open books
B) Lab #7: Virulence assays of *gcpA and ecpC* mutants on potato slices.
C) Lab #8: Assays and production of natural compounds by microbial fermentation technologies

March 7
Tuesday:
A) Lecture: Type 6 secretion system.
B) Paper presentation 1 & 2
C) Lab #8: Assays and production of natural compounds by microbial fermentation technologies

March 9
Thursday:
A) Lecture: Type 6 secretion system & antimicrobes.
B) Paper presentation 3 & 4
C) Lab #8: Assays and production of natural compounds by microbial fermentation technologies

March 14
Tuesday:
A) Paper presentation 5 & 6:
B) lab overview and discussion
C) Lab #8: Assays and production of natural compounds by microbial fermentation technologies

March 16
Thursday:
Exam 2. Online; open books

March 19 to 26 spring recession

Lab report 1 (wet lab) is due by 11:59 pm on March 26th (put in the Canvas), from the labs of February 1st to March 2nd (lab 1 to Lab 7).

Lab reports should be typed double spaced and follow the Instructions to Authors from the ASM Journal (https://journals.asm.org/organization-format) except that Materials and Methods will not be included. Do include any modifications to the methods specified in the protocols distributed by your instructor. Pre-lab assignments should be appended to the lab report.

Attendance: With the exception of extreme emergencies, which require official documentation, class attendance is compulsory. Each missed class will result in a 5% decrease to the student's total grade. If an absence is anticipated or in the case of an extreme event, please contact either instructor as soon as possible to discuss the problem.

Evaluation/Grading:
Grades (110 points total) will be based on a combination of lab reports, presentation, and exams. Exams will be open book. No final exam. The papers presented in the class will be assigned by the lecturer. There is one presenter for each paper presentation, however, everyone needs to read the paper. The presentation (in Power Point format) shall include introduction (defines background and importance of the research), body (methods and results from the scientific work), and conclusion (summarizes major points of the work). Scoring rubric for the oral presentations: Organization (1.5 points), Content (4.5 points), Presentation (4.0 points).

Section 1 (graduate)		Section 2		
lab report 1	20	lab report 2	10	
		lab report 3	10	
exam 1	20	exam 3	20	
exam 2	10	exam 4 (data homeworks)	10	
Presentation	10			
	60		50	110

Letter grades will be assigned based on the final total points (percentage) as listed below:

A	92 – 100%		C	71 – 75%
A-	89 – 91%		C-	68 – 70%
B+	86 – 88%		D+	65 – 67%
B	82 – 85%		D	61 – 64%
B-	79 – 81%		D-	56 – 60%
C+	76 – 78%		F	0 – 55%

Policy on Late Work: Any extensions of due dates for assignments need to be negotiated with faculty prior to due date. Late assignments will result in a 5% deduction of the assignment grade for each day the assignment is late. Late assignments will not be accepted 5 days after the due date.

Course and Instructor Evaluation: At the completion of the course, students will have the opportunity to complete instructor and course evaluation forms. The activity will take place on the last day of class. Student anonymity is guaranteed. According to College policy, the course faculty may not see their evaluations until final grades are submitted.

Laboratory: Attendance in labs is required. Due to the instability of the materials used in microbiology laboratory make-up labs usually cannot be scheduled.

Academic Misconduct: In this course you are expected to perform to the best of your ability in an honest manner. Cheating, plagiarism, or any other acts of misconduct will result in a severe penalty to you per UWS Chapter 14. Students are encouraged to consult with faculty regarding any questions about appropriate behaviors to maintain academic integrity. Any violation of academic integrity will result in a zero on the assignment and may result in additional sanctions consistent with university policy.
See UWM policies at:

http://www4.uwm.edu/acad_aff/policy/academicmisconduct.cfm

UNIVERSITY POLICIES:
The UWM policies that govern this course can be found at:
http://www.uwm.edu/Dept/SecU/SyllabusLinks.pdf
Additionally, please note the following:

1. Inclement weather: UWM student should contact the University at 229-4444 (UWParkside, 262-595-2345) or check the appropriate website to ascertain the status of class cancellation due to inclement weather. Even when classes are canceled, University offices and services remain available, unless the entire University is closed by the Governor. http://www4.uwm.edu or http://www.uwp.edu

2. Safety: Copies of safety techniques and strategies are available in the Office of Student Affairs. Information about UWM campus safety is found at:
http://www4.uwm.edu/current_students/student_services/safety.cfm

Accommodations for Students with Disabilities: If you are a student with a disability and require special accommodations please contact the instructor early in the semester, and also contact the Accessibility Resource Center (ARC) (Mitchell Hall Room 112, 229-6287, https://uwm.edu/arc/).

Snow Days: Call 229-4444 to determine if classes or exams are cancelled due to an emergency.