Course Title: Biosci 580
Experimental Microbiology

Credits: 4 credits

Prerequisite: Admission to a graduate program in the Biological Sciences or consent of the instructor

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<thead>
<tr>
<th>Instructor</th>
<th>Office</th>
<th>Email</th>
<th>Office hours</th>
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<tbody>
<tr>
<td>Ching-Hong Yang</td>
<td>Lap 131D</td>
<td><a href="mailto:chyang@uwm.edu">chyang@uwm.edu</a></td>
<td>Thursday 2-3 p.m (Yang Section)</td>
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<tr>
<td>Sergei Kuchin</td>
<td>Lap 444</td>
<td><a href="mailto:skuchin@uwm.edu">skuchin@uwm.edu</a></td>
<td>Thursday 2-3 p.m. (Kuchin section)</td>
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Class meetings times and location:
Tuesday and Thursday; Lapham 466, 9 am-12:50 pm

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, graduate 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 text for BioSci 580.

Course objectives: Upon completion 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 four-credit course, so 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; 10% of the time on Power Point presentation; 30% of the time on lab reports; and 10% of the time on quantitative data homework.

Class schedule:
Jan 24
Thurs:
A) Lecture: Host –microbe interactions. Lap 466.

Jan 29
Tues:
A) Lecture: Enterobacterial plant pathogens. Lap 466.
B) Lab: What happen to my rotten potato? Pectinase activity assay I.

Jan 31
**Thurs:**
Snow day

Feb 5
**Tues:**
A) Pectate lyases and the regulation part 1. Lap 466.
B) Lab: Kinetics of *Dickeya dadantii* Pectinase.6017 (Quantitative assay).

Feb 7
**Thurs:**
A) Introductory of fluorescence-activated cell sorter (FACS). By guest lecturer Dr. Steeber. Lap 466.
B) Lab: Detection of transcriptional activities of pel and type III secretion system genes of *D. dadantii* *in vitro* by FACS.

Feb 12
**Tues:**
Snow day

Feb 14
**Thurs:**
A) Lecture: Lecture: Pectate lyases and the regulation part 2. Lap 466
B) Lab: 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 mutants.

Feb 19
**Tues:**
A) Lecture: Regulatory components of pectate lyases and type III secretion system. **Lap 185**
B) Paper presentation 1 (round table discussion). **Lap 185**
C) Lab: Effect of EcpC on pectate lyase production, swimming, and T3SS expression **Lap 466**

Feb 21
**Thurs:**
A) Lecture: The second messenger Cyclic Di-GMP. **Lap 185**
B) Paper presentation 2 (round table discussion). **Lap 185**

Feb 26
**Tues:**
A) Lecture: Type 6 secretion system. **Lap 185**
B) Overview and discussion of lab results. **Lap 185**

Feb 28
**Thurs:**
Exam 1. **Lap 466**
March 5

**Tues:**
Paper presentation 3 (round table discussion). **Lap 185**
Lab: Bacterial 16rDNA analysis. **Lap 466**

March 7

**Thurs:**
Lecture: Introduction to phylogenetic tree. **Lap 185**
Paper presentation 4 (round table discussion). **Lap 185**
Lab: Bacterial 16rDNA analysis. **Lap 466**

March 12

**Tues:**
Lab: Introduction to phylogenetic tree. Lab practice building a cladogram. **Lap 271 (PC computer lab)**

March 14

**Thurs**
Exam 2. **Lap 466**

Lab report 1 (wet lab) is due by 11:59 pm on March 25th (put in the dropbox of the D2L), from the labs of January 24th to February 19th.

Lab reports should be typed double spaced and follow the Instructions to Authors from the Journal of Bacteriology (http://jb.asm.org/misc/ifora.shtml) 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.

**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. 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).

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<tr>
<th>Section 1 (graduate)</th>
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<tbody>
<tr>
<td>lab report 1</td>
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Letter grades will be assigned based on the final total points (percentage) as listed below:
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**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.