COURSE SYLLABUS FOR MCB 4034L: “Advanced Microbiology Lab”  
1 credit 

Fall 2011 semester: Tuesday, August 30th, 2011 – Thursday, Oct 13th, 2011

COURSE MEETING TIMES AND LOCATION: Labs will be held in the Microbiology and Cell Science Bldg. room 1030 (teaching lab), on Tuesdays and Thursdays as follows-

Section 1596: Periods 6-8 (12:50 pm – 3:50 pm) 
Section 0161: Periods 10-E1 (5:10 pm – 8:10 pm)

Labs will all be held in room 1030 of the Microbiology and Cell Science Building. The midterm-quiz and final exam will be held in the Microbiology and Cell Science seminar room (Room 1044), according to the attached schedule.

COURSE DESCRIPTION: Application of immunological, molecular biological and microbial techniques to the isolation, identification and characterization of bacteria and viruses.

PRE-REQUISITES: MCB 3020 or MCB 3023, MCB 3020L or MCB 3023L with a grade of C or better. MCB 4203, MCB 4304, PCB 4522 or PCB 5235 recommended

FACULTY CONTACT INFORMATION & OFFICE HOURS:

Dr. Kelly C. Rice, Ph.D. 
Microbiology and Cell Science Bldg. 
Office Room 1147 
(352)-392-1192 (Office) 
Email: kcrice@ufl.edu 
Office hours: Fridays 10 am – 12 pm

TEACHING ASSISTANTS: TBA

COURSE OBJECTIVES: Upon completion of this course, students should be able to:

1. Gain hands-on experience with several “advanced” microbiology and molecular biology techniques (i.e. isolation of DNA and RNA, dot blot analysis, real-time PCR, phage transduction) 
2. Understand the theory, advantages, and potential limitations of these techniques 
3. Perform data analysis & interpretation of experimental results using a variety of software and web-based resources 
4. Properly document experiments, results, and data analysis using an electronic laboratory notebook 
5. Complete objectives 1-4 in the context of a research project. 
6. Report the findings of this research project by writing a scientific abstract.

REQUIRED TEXTBOOK: No textbook is required. All course materials will be available through Sakai.

**Background reading materials, lecture notes, on-line assignments and other tools for this course will be available through the Sakai Learning Support System homepage [http://lss.at.ufl.edu/]. You will need to enter your Gatorlink username and password to access the system. If you do not have an active GatorLink ID, cannot remember your GatorLink login information, or if your ID does not work, please refer to the GatorLink website [http://gatorlink.ufl.edu] or to the UF Computing Help Desk (The Hub, 392-HELP) for assistance.

SUPPLIES: Lockers are available in the hallway to store your personal belongings during the lab period. A lock for your locker (during lab only) is recommended. Disposable gloves and other personal protective equipment will be provided as needed. Please dress appropriately in consideration of the lab activity (i.e. use of stains). FOR SAFETY REASONS, STUDENTS MUST WEAR CLOSE-TOED SHOES WHILE WORKING IN THE LAB. STUDENTS THAT DO NOT COMPLY WITH THIS REQUIREMENT WILL BE ASKED TO LEAVE THE LAB, WILL BE PENALIZED 25 POINTS (AS DESCRIBED UNDER ATTENDANCE POLICY BELOW), AND ARE RESPONSIBLE FOR MAKING UP ANY ENSUING MISSED COURSE WORK.
ATTENDANCE POLICY: Attendance and participation in all lab periods is mandatory, and attendance at each lab will be monitored by a sign-in sheet. If a student misses a lab, 25 points will be deducted from his/her overall grade at the end of the semester for each unexcused absence. The ONLY exception to the 25 point deduction is if a student has to miss a lab due to religious observance, illness, or bereavement, (documentation/proof for the latter 2 categories will be required). Absence due to professional school tests (MCAT, DAT, GRE), professional/graduate school interviews, or any other obligations will NOT be considered exceptions to the 25 point deduction; it is the student’s responsibility to try and avoid scheduling these commitments on lab days. The only way to avoid the 25 point deduction in these latter situations is if the student is able to attend an alternate lab section on the same day of the missed lab (space permitting). Students will still be responsible for entering a lab notebook entry for each missed lab (please “cite” the person from whom you are borrowing data/results for the purpose of completing the missing entry). Likewise, you are responsible for learning any missed course material (lectures, online assignments) for the midterm quiz and final exam, whether an absence is excused, unexcused, or unexpected.

“MAKE-UP” IN-CLASS ASSIGNMENT/QUIZ/EXAM: The administration of make-up quizzes, in-class assignments, and/or final exams is at the discretion of Dr. Rice, and will be assessed on a case-by-case basis.

REFERENCE LETTER POLICY: Upon request, Dr. Rice will write reference letters for students (applying to graduate and/or professional school only) that meet the following conditions: (1) Student has achieved a final letter grade of “A” in the class, (2) Student has no unexcused absences, (3) Student has no incomplete or missing coursework (on-line and in-class assignments, quiz, random notebook check, final exam, etc.), and (4) Student has actively-participated in class discussions and/or has met with Dr. Rice during office hours. Due to the large number of students that take this course each year, reference letters may be requested by students that meet the requirements listed above no later than 6 months after completing the course.

GRADES: The grading scheme for this course is as follows-

Mid-term quiz - 150 points  
Computer lab assignment - 100 points  
Scientific Abstract-Writing assignment – 100 points  
Random notebook check (1) - 50 points  
Final notebook grade - 200 points  
Final Exam - 250 points  
Online exercises (3 @ 50 points each) – 150 points  
TOTAL POINTS - 1000

Final letter grades will be assigned based on the number of points earned, as follows:

A = 930-1000 points  
A- = 895 – 929.9 points  
B+ = 870 – 894.9 points  
B = 840-869.9 points  
B- = 800-839.9 points  
C+ = 770-799.9 points  
C = 730-769.9 points  
C- = 700-729.9 points  
D+ = 650-699.9 points  
D = 600-649.9 points  
E = 0-599.9 points

Detailed information on current UF grading policies for assigning grade points can be found at [http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html](http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html).

QUIZ & COMPUTER LAB ASSIGNMENT: There will be one mid-term quiz to be given on TUES SEPT 20th, 2011 (room 1044), and one computer lab assignment to be completed in-class on TUES SEPT 27th, 2011 (room 1011, computer lab) (see attached course schedule for more details). There are Mac computers available in the computer lab to use for completing the in-class assignment. Alternatively, you are welcome to bring your laptop (with wireless internet access) to use.

SCIENTIFIC ABSTRACT-WRITING ASSIGNMENT: More details will be provided later in the semester (see laboratory outline).
**FINAL EXAM:** A 2-hour cumulative final exam (similar in format to the midterm quiz) that covers the entire semester’s material will be given on THURS OCT 13th, 2011, during your regularly-scheduled lab class. This will be held in room 1044.

**LABORATORY NOTEBOOK:** All students are required to maintain an electronic laboratory notebook (ELN) that details the completion of all laboratory experiments performed during the semester. For this purpose you will be required to download “Evernote” (http://www.evernote.com). This software is free and can be synched between your computer and mobile devices (smartphones, tablets, iPhone/iPad). You will be required to “share” access of your ELN with Dr. Rice in order to get graded for the random notebook check and final notebook grade. Detailed instructions on how to properly document and maintain your ELN will be given by Dr. Rice during the first week of class. **One random notebook check will be performed (worth 50 points of your total grade), therefore it is highly recommended to update your ELN after each lab. ELNs will be due on THURS OCT 13th, 2011 (before the exam) for final grading.**

**ONLINE EXERCISES:** Three on-line exercises will be assigned through the MCB4034L Sakai course website during the semester (see attached schedule for due dates). These will typically consist of an online web tutorial or other resource to be completed by the student, followed by a series of 5 multiple-choice questions. The links to the online material will be available throughout the semester, but students will have only one week to complete the multiple-choice questions associated with each exercise. **ACCESS TO THE MULTIPLE-CHOICE QUESTIONS WILL BE CLOSED AT 11:59 PM ON THE DUE DATE FOR COMPLETION. If the student fails to complete the multiple-choice questions prior to the due date, they will receive 0 points for that exercise. Absolutely no exceptions, extensions, or “make-up” assignments will be given!!!**

**Academic Honesty, Software Use, UF Counseling Services, Services for Students with Disabilities**

In 1995 the UF student body enacted an honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

**The Honor Pledge:** We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior.

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean or Student Honor Court.
It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

Software Use:

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university’s counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/
  
  Counseling Services
  
  Groups and Workshops
  
  Outreach and Consultation
  
  Self-Help Library
  
  Training Programs
  
  Community Provider Database
  
- Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/

Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/
# LABORATORY OUTLINE

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>NOTES</th>
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<tbody>
<tr>
<td>TUES AUG. 30</td>
<td><strong>LAB 1:</strong> Transposon mutagenesis and bacterial biofilm, screening a library for mutants defective in biofilm formation</td>
<td>On-line exercise #1 assigned: “Introduction to Biofilms”</td>
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<td>THURS SEPT. 1</td>
<td><strong>LAB 2:</strong> Crystal violet stain and quantification of biofilm development, streak out potential mutants on both TSA/Erm and TSA/Tet</td>
<td><strong>SCIENTIFIC ABSTRACT DISCUSSED AND ASSIGNED</strong></td>
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<tr>
<td>TUES SEPT. 6</td>
<td><strong>LAB 3:</strong> Isolation of genomic DNA</td>
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| THURS SEPT. 8 | **LAB 4:** Determination of DNA purity and concentration; agarose gel electrophoresis  
**LAB 5:** Phage transduction of transposon mutant with GFP-plasmid |                                                 |
| TUES SEPT. 13 | **LAB 6:** Dot blot; PCR synthesis of DIG-labeled DNA probe  
**LAB 7:** Verify “glowing” transductants and subculture |                                                 |
| THURS SEPT. 15 | **LAB 8:** Detection of Dot Blots  
**LAB 9:** Introduction to *C. elegans* | On-line exercise #2 assigned: CGC Wormbook |
| TUES SEPT. 20 | **MID-TERM QUIZ**                                                     | **COVERS LABS 1-8 AND ONLINE ASSIGNMENT #1**   |
| THURS SEPT. 22 | **LAB 10:** Set-up *C. elegans* infection model with “glowing” *S. aureus* wild-type and Tn mutant strains  
**LAB 11:** Pass *C. elegans* onto *S. aureus* wild-type and Tn mutant plates for RNA isolation | **FEEDBACK ON ABSTRACT FIRST DRAFTS** |
| TUES SEPT. 27 | **LAB 12:** Computer Lab: Identification of Tn insertions  
*(To-be handed in at the end of class)* | Online exercise #3 assigned: Real-time PCR tutorial |
| THURS SEPT. 29 | **LAB 13:** Score results from *C. elegans* infection model/ fluorescent microscopy  
**LAB 14:** RNA isolations |                                                 |
| TUES OCT. 4  | **LAB 15:** Determine purity and concentration of RNA, cDNA synthesis from RNA samples |                                                 |
| THURS OCT. 6  | **LAB 16:** Real-time PCR of cDNA to quantify gene expression; analysis of results | **SCIENTIFIC ABSTRACT DUE TODAY!!** |
### DEPARTMENT OF MICROBIOLOGY AND CELL SCIENCE LABORATORY REGULATIONS

1. Eating, drinking (this includes bottled water!), or smoking is not allowed in the laboratories.

2. Do not block the hallway while you are waiting to enter the laboratory. Sit in the classroom or on the benches in the hallway.

3. Note the locations of the emergency showers, fire extinguishers, fire exits, and restrooms.

4. At the beginning and end of each laboratory period, wipe off the top of your laboratory bench with the disinfectant solution provided at the end of each row.

5. Keep your work area free of non-essential materials at all times. The plastic tub from your locker should be kept on the shelf below the benchtop, as it is VERY flammable. Coats, purses, cell phones, headphones, iPODS, backpacks, laptop computers, etc. are NOT to be brought into the lab, for safety reasons. Lock valuables in your hall locker. Your lab notebook, writing utensil(s), and printed instructions are exceptions to this rule (these items can be brought into the lab), but take care to keep these items clean. For example, keep these items in a clean area of your bench well away from any active work areas, do not handle these items while wearing gloves, etc.

6. Long hair should be tied back during the laboratory period, and loose clothing should be kept well away from the Bunsen burner flames. **Please dress appropriately in consideration of the day’s lab activity (i.e. use of stains).** For safety reasons, students must wear close-toed shoes while working in the lab. Students that do not comply with this requirement will be asked to leave the lab, and are responsible for making up any ensuing missed course work. Avoid putting pens, pencils, fingers, etc. into your mouth.

7. **Always wear disposable gloves (provided) when working with live bacterial cultures and stains. Dispose of used gloves in the BIOHAZARDOUS BAGS (see number 8 below).**

8. Learn the correct and safe way of discarding items in the lab. Pipets should be placed into the stainless steel trays, pointing in a single direction. Culture tubes and flasks should have the markings removed with alcohol and be placed into the appropriate racks. Contaminated disposables are to be put into the BIOHAZARDOUS BAGS and/or into containers specially provided for this purpose. Non-contaminated trash must be put into the regular trash cans, NOT Biohazardous bags. Bacterial cultures must NEVER BE POURED DOWN THE SINK, NOR SHOULD THEY BE REMOVED FROM THE PREMISES.

9. Immediately report all accidents such as cuts, burns, spilled cultures, spilled stains, to the instructor. Take all precautions to avoid such accidents. Report any classmate who habitually demonstrates hazardous behavior.

10. Wash your hands with soap and water before leaving the laboratory, as well as any time during period as needed.

11. Consistent carelessness or disregard of these regulations may be cause for dismissal from the course.