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

Fall 2012 semester: Thursday, August 23rd, 2012 – Thursday, October 18th, 2012

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. Midterm and final exams 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 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, pre-lab quizzes, 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 may 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. 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/EXAMS: The administration of make-up assignments and/or 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-

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-term exam</td>
<td>150</td>
</tr>
<tr>
<td>LAB 11 (Basic bioinformatics lab)</td>
<td>75</td>
</tr>
<tr>
<td>Scientific Abstract-Writing assignment</td>
<td>125</td>
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<tr>
<td>Random notebook check (1)</td>
<td>25</td>
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<tr>
<td>Final notebook grade</td>
<td>150</td>
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<tr>
<td>Final Exam</td>
<td>250</td>
</tr>
<tr>
<td>Online exercises (3 @ 50 points each)</td>
<td>150</td>
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<tr>
<td>Pre-lab quizzes (5 @ 15 points each)</td>
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<tr>
<td>TOTAL POINTS</td>
<td>1000</td>
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</table>

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

- A = 940-1000 points
- A- = 900 – 939.9 points
- B+ = 870 – 899.9 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

For information on current UF policies for assigning grade points, see https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

MID-TERM EXAM: There will be one mid-term exam to be given on TUES SEPT 13th, 2012 (room 1044).

FINAL EXAM: A 2-hour cumulative final exam (similar in format to the midterm) that covers the entire semester’s material will be given on THURS OCT 18th, 2012, during your regularly-scheduled lab class. This will be held in room 1044.

**Both the midterm and final exams will be administered through Sakai using the Respondus lockdown browser. You will need to bring your laptop computer to class for both of these exams. Please ensure that you have installed the lockdown browser on your computer (please see Sakai Student FAQs for more information:**
https://lss.at.ufl.edu/help/Student_Faq#What_if_my_instructor_requires_me_to_use_the_Respondus_LockDown_Browser_to_take_my_test_2C_quiz_or_assessment.3F. If you cannot bring a computer to class, you must make alternative arrangements with the course instructor at least 1 week prior to the exam.

**SCIENTIFIC ABSTRACT-Writing Assignment:** More details will be provided later in the semester (see laboratory outline).

**Electronic 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. 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 25 points of your total grade), therefore it is highly recommended to update your ELN after each lab. ELNs will be due on THURS OCT 18th, 2012 for final grading.

**Online Exercises:** Three online 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.**

**Pre-Lab Quizzes:** Five on-line pre-lab quizzes will be administered through the MCB4034L Sakai course website during the semester. These open-book quizzes are designed to promote reading of the lab protocols before they are performed in class, and will typically be comprised of 5 multiple choice or fill-in-the-blank type questions based on the relevant lab protocols. **ACCESS TO THE PRE-LAB QUIZZES WILL FOLLOW THE SCHEDULE BELOW:**

<table>
<thead>
<tr>
<th>PRE-LAB QUIZ #</th>
<th>ACCESS BEGINS:</th>
<th>ACCESS ENDS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WED AUG 29 12 PM</td>
<td>THURS AUG 30 12 PM</td>
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<tr>
<td>2</td>
<td>WED SEPT 5 12 PM</td>
<td>THURS SEPT 6 12 PM</td>
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<td>3</td>
<td>MON SEPT 17 12 PM</td>
<td>TUES SEPT 18 12 PM</td>
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<tr>
<td>4</td>
<td>MON SEPT 24 12 PM</td>
<td>TUES SEPT 25 12 PM</td>
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<tr>
<td>5</td>
<td>WED OCT 10 12 PM</td>
<td>THURS OCT 11 12 PM</td>
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</table>

If a student fails to complete an on-line assignment or pre-lab quiz prior to the due date, they will receive 0 points for that assignment or quiz. Absolutely no extensions or “make-up” quizzes will be given, with the exception of proof of technical difficulty precluding on-time submission (see below).

**SAKAI HINTS for ONLINE QUIZZES AND ASSIGNMENT SUBMISSION:** It is recommended that you take online assessments during Help Desk hours whenever possible. If you have a problem while taking an Assessment, log out and log back in as quickly as possible. If the assessment is timed, the timer will continue to run while you are logged out. If you still encounter difficulties, take a screen shot of the problem so the Help Desk can investigate and you will have proof of the problem for your Instructor. Call the Help Desk (352-392-4357) immediately.

When you submit an Assignment you get a confirmation screen that contains a confirmation number. You might want to capture a screen shot or print it for your records. The Assignment list will also show this Assignment as "submitted" including the date and time of your submission. If you do not get the confirmation screen and your Assignment is not listed as "submitted," you have not submitted the Assignment. If your Instructor has chosen to submit all papers through the Turnitin anti-plagiarism service, you will receive an email saying your paper has been submitted to Turnitin. All of these are evidence that your Assignment was successfully submitted.

**Academic Honesty, Software Use, Campus Helping Resources, Services for Students with Disabilities**

**Academic Honesty**

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.
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."

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office.

(Source: 2011-2012 Undergraduate Catalog)

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

PLEASE NOTE THAT ALL UNAUTHORIZED ONLINE POSTING OR DISTRIBUTION OF MCB4034L COURSE MATERIALS IS CONSIDERED A FORM OF ACADEMIC DISHONESTY AND SUCH ACTIONS WILL BE TREATED ACCORDINGLY. The course materials (lecture notes, lab protocols, assignments, etc.) are assembled and intended for students taking MCB4034L ONLY, this is why they are only available for student use from the secure Sakai MCB4034L course website. Unauthorized posting of course materials infringes on UF's copyright policies and the "Fair Use" Act (http://www.generalcounsel.ufl.edu/faq/Copyright.pdf).

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/

Services for 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/
<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>THURS AUG. 23</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>
</tr>
<tr>
<td>TUES AUG. 28</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>
</tr>
<tr>
<td>*THURS AUG. 30</td>
<td><strong>LAB 3:</strong> Isolation of genomic DNA</td>
<td>PRE-LAB QUIZ DUE 12 PM</td>
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<tr>
<td>TUES SEPT. 4</td>
<td><strong>LAB 4:</strong> Phage transduction of transposon mutant with GFP-plasmid</td>
<td>On-line exercise #2 assigned: CGC Wormbook</td>
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<td>*THURS SEPT. 6</td>
<td><strong>LAB 5:</strong> Determination of DNA purity and concentration</td>
<td>PRE-LAB QUIZ DUE 12 PM</td>
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<td><strong>LAB 6:</strong> Analysis of transduction and subculture</td>
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<td>TUES SEPT. 11</td>
<td><strong>LAB 7:</strong> Introduction to <em>C. elegans</em></td>
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<tr>
<td>THURS SEPT. 13</td>
<td>MID-TERM EXAM</td>
<td>COVERS LABS 1-7 AND ONLINE ASSIGNMENTS #1 AND #2</td>
</tr>
<tr>
<td></td>
<td><strong><strong>BRING YOUR LAPTOP WITH LOCKDOWN BROWSER INSTALLED</strong></strong></td>
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<td>*TUES SEPT. 18</td>
<td><strong>LAB 8:</strong> Set-up <em>C. elegans</em> infection model with “glowing” <em>S. aureus</em> wild-type and Tn mutant strains</td>
<td>PRE-LAB QUIZ DUE 12 PM</td>
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<td><strong>LAB 9:</strong> Pass <em>C. elegans</em> onto <em>S. aureus</em> wild-type and Tn mutant plates for RNA isolation</td>
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<td><strong>LAB 10:</strong> PCR check of genomic DNA</td>
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<tr>
<td>THURS SEPT. 20</td>
<td><strong>LAB 11:</strong> Computer Lab: Identification of Tn insertions</td>
<td><strong><strong>BRING YOUR LAPTOP TO CLASS</strong></strong></td>
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<td><em>(To-be handed in at the end of class)</em></td>
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<tr>
<td>*TUES SEPT. 25</td>
<td><strong>LAB 12:</strong> Score results from <em>C. elegans</em> infection model/</td>
<td>Online exercise #3 assigned: Real-time PCR tutorial</td>
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<td></td>
<td>fluorescent microscopy</td>
<td>PRE-LAB QUIZ DUE 12 PM</td>
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<td></td>
<td><strong>LAB 13:</strong> RNA isolations</td>
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<tr>
<td>THURS SEPT. 27</td>
<td><strong>LAB 14:</strong> Determine purity and concentration of RNA, cDNA synthesis from RNA samples</td>
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<td></td>
<td><strong>LAB 15:</strong> Agarose gel electrophoresis of genomic DNA, PCR, and RNA samples</td>
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</table>
TUES OCT 2, THURS OCT 4, TUES OCT 9
NO CLASS!!!! A GREAT TIME TO SCHEDULE THOSE INTERVIEWS, DATS, MCATS, ETC. 😊
ALSO GIVES YOU TIME TO CATCH UP ON THOSE ELNS, ABSTRACT ASSIGNMENT, ETC.

*THURS OCT 11
LAB 16: Real-time PCR of cDNA to quantify gene expression; analysis of results
PRE-LAB QUIZ DUE 12 PM

TUES OCT 16
Review for final exam
SCIENTIFIC ABSTRACT DUE TODAY!!

THURS OCT. 18
FINAL EXAM
****BRING YOUR LAPTOP WITH LOCKDOWN BROWSER INSTALLED****
Lab notebooks due BY 11:59 PM!
Final exam (cumulative; covers all semester’s material)

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.