

MCB 4034L: Advances Techniques in Microbiology Laboratory

MCB4034L is an upper division undergraduate course in Microbiology and Cell Science. This course will cover advanced techniques used to genetically modify microorganisms. It will emphasize bacterial genetics and physiology. However, the fundamental techniques used in the course are applicable to archaea and eukaryotic cells as well. This course will provide a conceptual and practical background in microbiology sufficient to enable students to take more advanced courses in related fields.

Student Learning Outcomes – After successful completion of this course, students will be able to:

- 1) Acquire experience with fundamental molecular biology techniques like DNA isolation, cloning, and protein purification.
- 2) Get the necessary skills to plan and execute fundamental assays directed to genetically modify microorganisms (bacteria).
- 3) Acquire hands on experience and reach an accurate interpretation of laboratory results.
- 4) Associate the concepts learned with potential applications in biotechnology.
- 5) Apply theoretical concepts learned in basic courses to explain experimental results.
- 6) Express the results using technical language to properly report the laboratory achievements.

Laboratory practices: Students will be sent kit containing materials required for conducting experiments at home. The course will use a combination of practices, including online demonstration videos, recorded lectures, and quizzes and activities delivered through Canvas.

Instructors:

Dr. Leandro Teixeira. Office: Microbiology department, Room 1047.

Dr. Jaysankar (Jay) De. Office: Microbiology department, Room 1045.

Teaching Assistant:

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Webpage: Canvas (<https://ufl.instructure.com/>). Please select MCB 4034L.

Online help with classroom technology: <http://helpdesk.ufl.edu/>

Prerequisite: MCB 3020/L or MCB 3023L with minimum grades of C

Communication: For questions regarding class and content use the discussion board. For issues on homework assignments and class organization check the syllabus first, the announcements and calendar on Canvas, then post your questions on the discussion board. For all other issues contact the TA of the course, and lastly Drs. De and/or Teixeira.

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Contact Information:

Contact the TAs via canvas.

Regular Office hours: By appointment: send an e-mail with three suggested times and we will choose one for us to meet.

Discussion Board: A discussion board is available in Canvas. This Canvas tool is very useful, please post and answer questions on class content and organization there. Postings and answers are monitored by the instructors to make sure no mistakes get propagated. There are several discussion themes. Please post your questions in the adequate section. The discussion board is also used for certain graded assignments to prepare for lecture and group's work.

Material

Textbook: No textbook is required for this course.

The students should take notes (abundant in details) *from modules and online materials* to be used in the final report and as study material for the tests.

Assessment of learning

- Participation: 50 points.
- Quizzes: 125 points.
- Final report: 75 points.
- Poster: 50 points.
- Final exam: 200 points.

Participation

Participation in all activities is mandatory. Should a conflict arise, notify the instructor in advance if possible and find arrangements to make up the missed material and quizzes. You must e-mail your instructor within 24h before/after the missed activity to qualify for makeup opportunity and provide valid written excuse.

Quizzes

Pre-lab quizzes given at the beginning of class will cover the concepts and techniques to be discussed/performed during that lab. The activities include timed multiple-choice quizzes, study cases etc. These quizzes will be graded for completion, not accuracy. Tardy students will be given any time remaining to complete the quiz but will not be given the full quiz time to complete the assessment. Students who attempt after the quiz time has expired will not be allowed to take the quiz. This aids the instructor in finding gaps in understanding of the specific exercise, so those can be focused on during the experiment/exercise. Points will only be deducted if students do not complete the quiz (e.g. if they are tardy and run out of time).

Final report

Students have to work on a FINAL REPORT individually. Such a report should have a minimal of 3 pages, max 6 pages. Graphics and flow charts use is highly encouraged. Only Original pictures (and charts) obtained during Lab Sections can be included. The report should connect all laboratory assays meaningfully. A conclusion plus a personal statement regarding genetic manipulation should be included.

Poster

Each student must record o short (10 minutes) poster presentation. The topic of the presentation should be related with the experiments done in the course.

Final

There will be one proctored 120 minutes final exam (200 points) with multiple choice questions, true/false. Final exam is mandatory and will count towards the final grade. Exam will test learning and understanding of material presented in the textbook, in lectures and in assignments as well as integration and application skills.

Excused absences:

Documentation **MUST** be provided for absences caused by serious illness, accident, jury duty, or death in the immediate family. You must contact the instructor(s) for the missed exam, and we will arrange an alternative time for the exam if the absence is properly justified.

After the exam: The grades will be available on Canvas three days after the exam, unless notified by an announcement. Test questions will be made available through Canvas.

Grading

Grading scale - in percentage

A 93.0% and above C 72.0% - 75.9%

A- 89.0% - 92.9%	C- 69.0% - 71.9%
B+ 86.0% - 88.9%	D+ 66.0% - 68.9%
B 82.0% - 85.9%	D 62.0% - 65.9%
B- 79.0% - 81.9%	D- 59.0% - 61.9%
C+ 76.0% - 78.9%	E below 59.0%

Grades and Grade Points

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

Attendance/Participation and Make-up Policy:

Participation in activities is mandatory and will be monitored. Students are expected to be on time and prepared for the activities per the protocol. Excess of one unjustified absence will result in point deductions. More than two absences may result in expulsion from the course. This is a short, intensive course with many exercises and concepts built on the previous class. As a result, there is no possibility to make-up work from missed laboratory activities and students will not be able to obtain points from that class (i.e. no quiz make-up, etc.) unless the absence is excused. For all absences, documentation **MUST** be provided (doctors note, notification of military service, etc.). Further information regarding make-up exams, assignments and other work can be found at: <https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>

Students with disabilities:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the Disability Resource Center (<https://disability.ufl.edu/get-started/>). It is important for students to share their accommodation letter with their instructor and discuss their access needs as early as possible in the semester.

Online Course Evaluation Process:

Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide professional and respectful feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times

when they are open. Evaluations can be completed through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluer.com/ufl/>. Summary results of these assessments are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

Academic Honesty

As a student at the University of Florida, you have committed yourself and are bound to uphold the Honor Code, which includes the following 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 by abiding by the Honor Code.” You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code>.

In-Class Recordings:

Students are allowed to record video or audio of class lectures/demonstrations. However, the purposes for which these recording may be used are strictly controlled. They only allowable purposes are: (1) for personal educational use, (2) in connection with a complaint to the university, or (3) evidence in, or in preparation for, a criminal or civil All other purposes are prohibited.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of that presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include student presentations, academic exercises involving solely student participation, assessments (quizzes, tests, exams), private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to

social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Software Use:

All faculty, staff and students at 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. Both the Counseling Center and Student Mental Health Services provide 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.

- U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in
- Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.
- Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need or visit the Student Health Care Center website.
- University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.
- GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-

Academic Resources:

- E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.
- Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling
- Library Support: Various ways to receive assistance with respect to using the libraries or finding
- Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420. General study skills and

- Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing
- Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more
- On-Line Students Complaints: View the Distance Learning Student Complaint

Laboratory schedule (tentative)	Activities for the lab
Day 1	Making fresh cultures
Day 2	Genomic DNA extraction Plasmids extraction
Day 3	p15TV-LIC plasmid digestion Plasmid clean-up PCR of alpha amylase gene Gel electrophoresis
Day 4	Ligation Independent Cloning
Day 5	Plasmid extraction from DH5a BL 21 transformation
Day 6	Protein extraction and purification Enzymology with casava starch

Mandatory Personal Protective Equipment

During each lab activity, students are required to always wear a lab coat and face mask. Both will be provided to the student and will be stored in a personal contained ziplock bag to be used all semester. Personal masks are acceptable. You also must wear gloves, closed toed shoes and are strongly recommended to wear long pants or long sweatpants. NO eating, drinking, chewing gum etc. is allowed to avoid cross-contamination during the experiments. Not following these instructions will result in dismissal from course.

Please follow all UF COVID_9guidelines. <https://coronavirus.ufl.edu/> and <https://coronavirus.ufl.edu/university-updates/august-6-campus-brief-.html>

“Due to the surge in COVID-19 cases because of the delta variant, we expect everyone to always wear a mask when inside any UF facility, even if you are vaccinated. UF also urges all people to get vaccinated.”

UF In Class Recording

Students are allowed to record video or audio of class/demonstration lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor. A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without the permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.