COURSE SYLLABUS FOR MCB 4034L: "Advanced Microbiology Lab"
1 credit
Fall semester 2025: Thursday August 21 – Friday October 10

1. COURSE MEETING TIMES AND LOCATION:
Labs will be held in the Microbiology and Cell Science Bldg. on Tuesdays and Thursdays as follows:

Class number 13259: Periods 3-5 (9:35 pm – 12:35 am) -- room 1030
Class number 13437: Periods 7-9 (1:55 pm – 4:55 pm) -- room 1030

All labs will be held in person, in the above room of the Microbiology and Cell Science Building, according to the course schedule. The final exam may be held in a different room, to be announced. The instructor reserves the right to change the schedule as deemed necessary to complete the objectives of the course and will inform the students of this via e-learning and/or lectures. A detailed schedule of activities is available on the last page of this syllabus.

2. COURSE DESCRIPTION
Application of microbial, molecular biological and immunological techniques to the expression, isolation, identification and characterization of recombinant proteins produced in bacteria. The approaches are relevant in both basic (biomedical) research and industrial production of proteins and are intended to prepare the students for graduate school, professional careers in microbiology, as well as (temporary) employment as research assistants in research labs. Mastery of the skills and knowledge covered in the course will increase the likelihood of being hired and of performing well in the job. This is confirmed every semester by thank-you messages from former students. The course material is also helpful in preparation for MCAT, DAT and medical/dental school.

3. PRE-REQUISITES:
MCB3020L or MCB3023L with a grade of C or better.
MCB4203, MCB4304, PCB4522 or PCB5235 recommended
Section 23 list specific concepts and topics that students are expected to be familiar with at the start of the course.

4. CONTACT INFORMATION:

Instructor:	Dr. Wilfred Vermerris	wev@ufl.edu
Graduate TA:	Aubrey Atkins	aubrey.atkins@ufl.edu
Undergraduate TA's for morning section:	Mallory Cadiz	mallory.cadiz@ufl.edu
	Will Moore	moorejames@ufl.edu
Undergraduate TA's for afternoon section:	Julia Williams	juliawilliams1@ufl.edu

The instructor and TA's will be available at the beginning and end of each class to answer questions. The TA's can provide further assistance/clarification related to course material outside class hours via email. Responses will typically be sent within 4 hours after receipt (during business hours). The graduate TA will host a weekly online office hour to answer questions (time to be announced). Please contact the graduate TA and/or instructor for questions related to attendance or special accommodations. Professional interactions with the instructor and TA's are expected at all times.

5. COURSE OBJECTIVES:
Upon successful completion of this course, students will:
1. Understand the theory, advantages, limitations and correct way of executing several advanced microbiology and molecular biology techniques (i.e. isolation of DNA and proteins, manipulation of DNA, sequencing, western blotting) that are commonly used in life sciences research labs in labs in academia, government and industry.
2. Be able to perform data analysis using a variety of software and web-based resources, interpret experimental results and troubleshoot failed experiments
3. Be able to correctly perform relevant calculations necessary to ensure successful outcomes of the experiments
4. Understand how these techniques are applied for the production of recombinant proteins in industrial microbiology and basic research

6. REQUIRED TEXTBOOK/ SOFTWARE/ COMPUTER
No textbook is required. All course materials, including background reading materials, lecture notes, on-line assignments, quizzes, and other tools for this course will be available through the Canvas Learning Support System

homepage [http://elearning.ufl.edu/]. In addition, a student version of the SnapGene software package (http://www.snapgene.com; GSL Biotech, LLC) may be required. Details for how to obtain a copy of this software will be provided in class. The software may only be installed on one computer per student and will expire at the end of the course. To review the privacy policy of Canvas, please visit https://www.instructure.com/policies/privacy. For details on the accessibility of Canvas, please visit https://www.instructure.com/canvas/accessibility. 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.

You will need to bring a WiFi-enabled computer or tablet to class in order to submit answers to exams and quizzes. The computer can also be used to take notes.

7. LAB FEES, PROTECTIVE EQUIPMENT AND DISTRACTIONS

The department assesses a lab fee for this course that covers the cost of the materials we use, including enzymes, gels, pipette tips, tubes, culture medium, petri dishes, DNA isolation kits, antibodies, membranes and various chemicals.

Students are **required** to wear a **lab coat** during class. This reflects good standard laboratory practice for general safety and to prevent contamination during lab exercises. The lab coat (available in different sizes) will be provided on the first day of class and must be labeled with the student's name on the chest pocket. The lab coat needs to be buttoned to provide maximal protection and prevent items from getting knocked off the benches. The lab coat can be stored in the lockers located in the hallway. The lockers can also be used during class to store food, drinks and personal belongings. In addition, **disposable gloves**, **safety goggles** and other personal protective equipment will be provided as needed. Please dress appropriately in consideration of the lab activity (i.e. use of stains, microbial cultures). For safety reasons, all students are required to wear **closed-toed shoes** in the lab. Failure to comply with the requirement to wear protective equipment will result in dismissal for that particular day and a 25-point penalty. You may bring your own N95 facemask or use a mask provided by the department if you like.

The use of messaging and streaming apps and social media, on cell phones, tablets or computers is **prohibited** during instruction and experimental procedures. The reason for this policy is that these activities represent a major distraction that can (1) impede learning, (2) result in failed experiments due to missing important instructions from the instructor or TA, and (3) delay a timely response to a hazardous situation, thereby creating a safety risk for the distracted party and those around them. Messages and email can be checked during designated breaks.

8. ATTENDANCE POLICY

This is a fast-paced course where each session relies on information from the previous session. Attendance and participation in all lab periods are mandatory, and attendance at each session will be recorded. Sessions start promptly at the beginning of period 3 (morning section) or period 7 (afternoon section), and late arrivals (>10 min) will count as absence. It is important to prevent conflicts with other activities during class times. It is, however, understood that this cannot always be avoided. Each student is allowed one absence to take care of personal or professional matters (religious observance, illness, UF-sponsored event, funeral, interview for graduate/medical/dental/vet/pharmacy school, conference, etc.). Additional absences will only be excused if they are due to a religious observance, UF-sponsored event, illness, or bereavement (documentation/proof for the latter three categories will be required). Biochemistry exams scheduled during regular lab times do not count as an excused absence. For each unexcused absence beyond the one missed class, 25 points will be deducted from the overall point total at the end of the semester. Students who miss a lab will need to let their partner know of their absence and will be responsible for learning any missed course material (lectures, assignments) for the midterm quiz and final exam, whether an absence is excused, unexcused, or unexpected. It is recommended that you communicate with the graduate TA and instructor as soon as you are aware of a pending conflict or situation that will compromise your ability to attend class.

9. "MAKE-UP" EXAMS

The administration of make-up exams is at the discretion of the instructor and will be assessed on a case-by-case basis.

10. HOW TO DO WELL IN MCB4034L

This course is called 'Advanced' for a reason and requires the students to come to class prepared in order for the background material discussed in class to make sense, and for each lab session to end on time (this is important because of other lab courses scheduled in the same room afterwards). This will careful reading and following of the protocols that describe the various experimental procedures, spending time outside scheduled class hours to review, practice

and complete assignments. Planning, design of experimental procedures and troubleshooting are an integral part of the class, and will require mastery of the basic principles underlying the course material. Those students who obtained a grade of C or lower for the course in past semesters tended to *not* keep up with the course material, performed poorly on quizzes, did not review mistakes on quizzes prior to the exams, did not ask for help in class or during the weekly office hour, and did not change study habits after a weak performance on the mid-term exam.

11. GRADES

The grading scheme for this course is as follows:

Quizzes (8 @ 25 points each)	200 points (the best 8 out of 9 will be counted; see below)
Mid-term exam	240 points
Online assignments (50; 75; 85; 110 points)	320 points
Final Exam	240 points
TOTAL	1,000 points

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

A = 940-1000 points	B- = 800-839.9 points	D+ = 650-699.9 points
A- = 900 – 939.9 points	C+ = 770-799.9 points	D = 600-649.9 points
B+ = 870 – 899.9 points	C = 730-769.9 points	E = 0-599.9 points
B = 840-869.9 points	C- = 700-729.9 points	

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

12. WORK IN TEAMS/INDIVIDUAL WORK

You will be working in fixed teams of two students for the duration of the semester **on specific tasks and assignments, as indicated in the instructions**. Note that all quizzes and exams as well as some assignments need to be completed on an individual basis. Teams will be formed by individual students during the first day of class based on seating. The seat you select on the first day of class will be your designated seat for the remainder of the course. This will facilitate tracking of samples as well as the instructor's ability to learn the students' names.

13. MID-TERM EXAM

There will be one mid-term exam during one of the regular lab sessions (see course schedule for exact date). The exam will be a mixture of multiple choice/ multiple answer/ true-false/ fill-in-the-blank questions and calculations on topics covered during the weeks preceding the exam. You do not need to memorize protocols (volumes, incubation times, centrifuge speeds), but you will need to understand what happens at the different steps of the protocols we have used. Details on the way the exam will be structured will be discussed further in class.

14. FINAL EXAM

A cumulative final exam (similar in format to the mid-term) that covers **the entire semester's material** will be given on the last day of class in a classroom to be determined.

15. ASSIGNMENTS

Four on-line exercises will be assigned through the MCB4034L Canvas course website during the semester (see schedule for due dates). Two of these will consist of questions/tasks related to an online web tutorial, protocol, software or other resource. A third assignment will rely on the use of a common software (SnapGene) for sequence alignment, and the fourth is based on a research article from the primary scientific literature that describes the expression and purification of a recombinant protein and that is to be selected by each student individually according to their own interests. Answers to a series of questions pertaining to the selected article will need to be submitted. Extra-credit assignments may be offered at the discretion of the instructor.

16. QUIZZES

Nine quizzes will be administered through the MCB4034L Canvas course website throughout the semester. These **open-book quizzes** serve two purposes: (1) to evaluate understanding of concepts discussed in class (maintain engagement and provide feedback) and (2) to promote reading of the lab protocols, which will help improve results on-time completion of the experimental procedure. These quizzes will typically be comprised of 4-6 multiple choice or fill-in-the-blank type questions based on the relevant lab protocols. They are worth 25 points each and will be available for 10-12 minutes. *The time allotted for the quizzes is "double time" based on how long it will take to answer*

the questions if you have previewed the course material for that day and reviewed the material from the previous session. The best eight quiz scores will be counted towards the grade. Missing a quiz due to absence or arriving late will result in zero points. A missed quizz due to an allowable absence means that all eight quizzes a student did take will be used towards the 200 quiz points. In other words, the missing quiz is the quiz that will be dropped at the end of the course. No make-up quizzes will be given.

17. CANVAS HINTS FOR ONLINE ASSIGNMENT SUBMISSION

It is recommended that you work on online assignments during Help Desk hours whenever possible. If you have a problem while working on an assignment, 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. The Assignment list will also show this Assignment as "submitted" including the date and time of your submission. If your Assignment is not listed as "submitted," you have not submitted the Assignment.

18. REFERENCE LETTER POLICY

Upon request, Dr. Vermerris will write a limited number of reference letters for students applying to graduate and/or professional school who 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 (assignments, quizzes, exams), (4) Student has actively participated during the course (on-time record, asked questions, volunteered answers; no disruptive behavior).

19. COURSE EVALUATIONS

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. The feedback will help efforts to enhance instruction in subsequent semesters. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or viahttps://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

20. IN-CLASS RECORDING

Students are allowed to record video or audio of class 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 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.

21. 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.

UF students are bound by The Honor Pledge, which states: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students 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." The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Click here to read the Conduct Code. If you have any questions or concerns, please consult with the instructor or TA's in this class. 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.

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor. **Violations will be reported and will result in penalties**.
PLEASE NOTE THAT ALL UNAUTHORIZED DISTRIBUTION OR ONLINE POSTING 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 Canvas 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
352-392-1601
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/

It is important for students to share their accommodation letter with the instructor and discuss their access needs as early as possible in the semester.

Office of Academic Support Services:

https://oas.aa.ufl.edu/services/

Student Life Success Services:
https://www.ufl.edu/student-life/success-services/

To find and contact your Academic Advisor:
http://www.ufadvising.ufl.edu/college-remote-advising-contacts/

22. TENTATIVE COURSE SCHEDULE

This schedule is subject to change
Please monitor announcements from the instructor sent via Canvas with due dates and times for assignments

Fall 2025 schedule
MCB4034L (Vermerris)

Date		Week	Lab	Quizzes	Assignments	Exams	Course Objective
21-Aug	Thu	1	Expectations, safety, rationale for the experimental procedures; practice gels				1
26-Aug	Tue	2	plasmid miniprep; measure concentration;	1			1, 2
28-Aug	Thu		plasmid digest; agarose gel electrophoresis; gel extraction and purification	2	RT-PCR		1, 3
2-Sep	Tue	3	measure concentration; RT-PCR, agarose gel, cleanup PCR, measure conc.; PCR product digest				1, 2, 3
4-Sep	Thu		(PCR product digest); ligation, transformation	3	Primer design		1, 2
9-Sep	Tue	4	pick colonies; colony PCR, inoculate cultures; agarose gel, select colonies	4			1, 2
11-Sep	Thu		plasmid miniprep; measure concentration; submit to sequencing; Q&A	5			1, 2
16-Sep	Tue	5	mid-term exam (in class; need lap top and calculator; closed notes)			Mid-term exam	1, 2, 3
18-Sep	Thu		analyze sequence data; (transform BL21 cells)	6			1, 2, 4
23-Sep	Tue	6	prepare cell lysate				1, 2
25-Sep	Thu		protein purification (IMAC)	7	plasmid design		1, 2
30-Sep	Tue	7	PAGE, make western blot	8			1, 2, 3
2-Oct	Thu		immunolabeling of western blot; functional assay; Q&A for exam	9	Research article review		1, 2
7-Oct	Tue	8	final exam (in class; need lap top and calculator; closed notes)			Final exam	1,2,3,4
10-Oct	Thu		Assignment 4 is due				1,4

Reading material (protocols, background information) will be available in Canvas, under Modules, organized by week
Due dates and times of assignments will be communicated via email and Canvas
Submission of assignments, quizzes and exams via Canvas

Course objectives (from syllabus)

1 Theory, advantages and limitations of lab procedures
2 Use of software for data analysis; interpretation of results; troubleshooting
3 Calculations (concentrations, dilutions)
4 Application of lab procedures to the production of recombinant protocols

23. CONCEPTS AND TOPICS STUDENTS ARE EXPECTED TO BE FAMILIAR WITH AT THE START OF THE COURSE

Nucleotides
DNA structure
RNA structure
DNA replication of leading and lagging strands
Plasmids
Theta replication of plasmids
Mutations
Impact of mutations
Structure of genes in eukaryotes
Structure of genes in prokaryotes
Operons
lac operon
Transcription in prokaryotes
Transcription in eukaryotes
Translation
Genetic code, codons
Polymerase chain reaction
Gel electrophoresis

Links to short videos explaining these concepts are provided as a refresher in Canvas under "Prerequisite knowledge".

Spectrophotometry and optical density
Molarity (calculations involving mass, volume, and molecular weights)
Sterile technique
Correct use of pipettes