Los Angeles Mission College

Biotech-2 – Sections 17511 & 17512

Introduction to Biotechnology

Syllabus, Fall 2023

8/28/23 - 10/22/23

Instructor: *Chander Arora, Ph.D*
Email: aroracp@lamission.edu
Phone & Voicemail: (818) 364-7753

Office Hours: Open: Mon, 7:00am-7:45am, Wed, 7:00am-7:45am (Zoom)
Or By appointment on zoom (Mon, 1:00pm - 4:35pm).

Lecture: Mon, Wed. 8:00 AM-10:10am (Remote, Synchronous)
Lab: Mon, Wed. 10:15-12:20pm (Remote, Synchronous)
Lab: Tue, Thu**.** 8:00 AM-12:20pm in CMS 106 (In-person)

Prerequisites: None
Advisories: This course is CSU transferrable
Articulation: Please see www.assist.org for information regarding articulation agreements.

Student Learning Outcomes:

1. Examine and apply the fundamentals of cellular and molecular biology concepts to biotechnology research and its practical applications.
2. Develop and maintain laboratory records according to standard scientific and industrial guidelines.

Course Description: *Biotech 2 provides a foundation for the field of biotechnology. Students examine the fundamentals of cellular and molecular biology and are introduced to basic biotechnology laboratory skills, including documentation, safety, solution and buffer preparation, quality control and bioethics. Students develop proficiency in aseptic technique, spectrophotometry, microscopy and centrifugation.*

Course Objectives:

By the end of this course each student should be proficient in:

1. Applying principles of lab safety.
2. Keeping accurate records with sufficient information to reproduce what was done.
3. Preparing aqueous solutions of varying composition.
4. Applying core principles of cell and molecular biology.
5. Applying core principles of centrifugation and spectrophotometry.
6. Preparing microbiological media and applying aseptic technique in the culturing of microorganisms.
7. Oral and written communication, maintaining a professional work ethic, and working well with others.

Required Texts:

- **Open Stax – Biology, Clark *et al* 2020, (ISBN-13: 978-1-947172-52-4) available for free**
- **MATERIALS:** bound lab/computation notebook (graph ruled), *Sharpie* pen (black fine & regular point), ball point blue or black pen, scientific calculator, lab coat.

Evaluation and Grading

Exams

All Quizzes and Exams account for 70% of your final grade. There will be eight lecture quizzes and a final lecture exam (please refer to schedule). The final exam is **Wednesday, October 18th** from 8-11 AM. Please make personal, family and work plans accordingly.

Exams consist of some combination of the following: true/false, fill in the blank, matching, multiple choice, definitions, and short answer. Questions will be based on the readings, assignments, handouts, lectures and as well as all aspects of what is covered in the laboratory portion of the course.

If you are late to the exam you will only have the remainder of the allotted time to complete the exam. No extra time will be allowed. **There is a strict no make-up exam policy.** A student who has an excused absence from one quiz only will have the percentage earned on the next examination counted for that missed score.

No hats or electronic devices (including calculators, phones, Bluetooth devices, iPods or other mp3 players, dictionaries, translators etc.) are allowed during exams. All backpacks and belongings must be placed at the front of the room and all cell phones and other electronic devices must be **turned off (*not silent*)** before the exam begins. Cheating of any kind will not be tolerated, will result in zero on the exam and be reported to the college for disciplinary action. You must check with me before leaving the classroom to use the restroom during exams.

Soft Skills and Participation

Assignments and participation account for 8% of your final grade. This includes teamwork, communication and reflections on your learning. These will be submitted via Canvas.

Project and Oral Presentation

Project and Oral Presentation on Biotech Products and Companies will account for 10% of your final grade. Science requires research, critical thinking, and effective communication skills. You will research and read about a current, product being manufactured by a Biotech company. For the project report, you will write a 1,600-word essay discussion the product, the disease it is used for, the biochemical nature and the mechanism of action for this product. In addition to the written project, you would also present it to the class for 5-10 min. The research paper accounts for 10% of your overall grade in the course. More information will be given in class and posted on the course Canvas page. The Oral presentation and project is due on **Monday, Oct 16th.**

Lab Exercises and Performance

- Lab exercises and performance will account for 10% of your grade.
- The lab portion of the course is intended to teach you the methods by which science is performed. You will learn to conduct a variety of observations and measurements using multiple types of lab tools and instruments. The lab will focus upon using the scientific method to learn about the real world by using chemicals, micro-measurements, making buffers, solutions, culture techniques and water testing assays. There will be a series of labs that include class exercises and written assignments intended to develop these skills.
- In addition, a part of your score includes your performance; you may be penalized for failure to follow instructions, in appropriate behavior, sloppy work, messy benches, and having food or beverages.
- All written lab assignments (questions, graphs, tables, charts etc.) are due *at the beginning of the next lab period*.
- ***There are no make-up labs.*** Missed labs will result in a zero for that lab.

Lab Exams

There will be 2 in-person lab exams. The lab exams will account for 20% of your final grade. The lab exam consists of two portions, one group and one individual on **Thursday, October 19th**.

Grading Policy

All grades will be posted in the Canvas gradebook. Please keep all returned work. Notify the instructor immediately if you notice any discrepancies between scores in the gradebook and your graded papers or if you have questions about your grade. *There will be no extra credit assignments offered in this course.* The tables below show how grades are earned in the course. *Please note that this course is not curved.*

A. Point Distribution:

Lecture:	
8 Quizzes (each worth 20 pts):	**160 pts**
Lecture Final:	100 pts
Soft Skills/Participation	40
Oral Presentation (Biotech Companies)	50 pts
Lab:	
Lab Exercises, Note book:	50 pts
Lab Exams	100 pts
Total Points:	**500 pts**

B. Percent Distribution:

Lect/Lab	Activity	Percent
Lecture (70 %)	Soft Skills and Participation	8
	Oral Presentation	10
	Lecture Quizzes	32
	Lecture Exam	20
Lab (30%)	Lab Exam-1	10
	Lab Exercises	10
	Lab Exam-2	10

C. Letter Grade:

Letter Grade Determination	
Grade	**Percentage**
A	90 - 100
B	80 - 89
C	65 - 79
D	50 - 64
F	≤ 50

Attendance policy

Regular participation in class discussions and exercises is necessary from everyone for this to be a successful and engaging course. Attendance & participation is thus required for all lecture and lab sessions. **Following LAMC policy, students that miss any three class sessions (lecture or lab) may be dropped for lack of participation in the course.** If you miss any of the class meetings in the first week without contacting the instructor in advance, you will be dropped from the course.

If you must be absent or late due to special circumstances**, it is your responsibility to inform the instructor ahead of time and contact another student for the information missed.** You are responsible for any information addressed in class, whether or not you are present.

LACCD is following the Los Angeles County Department of Public Health (LADPH) guidelines. Masking is no longer required but recommended. If you test positive for COVID-19 you must isolate per LADPH isolation guidelines. Please inform your instructor so they can work with you accordingly. If you are experiencing symptoms of illness, please wear a mask, which is provided in the classroom.

Please note: food and drinks are prohibited in the lab room for safety reasons, so cabinet storage will be provided for your use.

Academic Dishonesty

By enrolling as a student in this course, you accept responsibility to maintain integrity in your work. This includes what you submit for all assignments, quizzes, and exams. Unless your instructor explicitly states otherwise, you are expected to submit work that you completed as an individual to represent your own learning for this course attempt. This means that you agree to follow the Standards of Student Conduct from the college catalog (pages 52-54) and will not engage in: copying another's work; allowing someone else's work to be submitted as if it was your own; using an AI program to create written content; using resources the instructor does not allow during assessments; submitting material without properly citing sources; or self-plagiarism, including submitting work completed for a previous attempt or another course. Evidence of breaking this contract will result in serious consequences, which may include earning a zero on the assignment and formal documentation with the department chair. If you are unsure if an act constitutes plagiarism, ask your instructor or librarian for clarification.

Special Accommodations

If you require special accommodations for a disability, religious holiday, etc., please inform me within the first two weeks of the course and I will accommodate you if at all possible. In general, recording of the lectures requires prior approval by the instructor.

LAMC students with verified disabilities who are requesting academic accommodations should use

the following procedure:

Step 1: Obtain documentation of your disability from a licensed professional. You may contact DSP&S to request a Disability Verification Form.

Step 2: Make an appointment to meet with a DSP&S Specialist to review your documentation and discuss reasonable accommodations. To schedule a meeting, please call DSP&S at (818) 364-7732.

Step 3: Bring your disability documentation to your DSP&S appointment. The DSP&S office is located in room 1018 of the Instructional Administration (IA) building.

Step 4: Each semester, reach written accommodation agreement with the DSP&S Specialist and your instructor.

Please complete this process in a timely manner to allow adequate time to provide accommodation.

Resources for Students

- **Life Sciences Department Program Information:** If you would like to review the degree and certificate programs offered through the LAMC Life Sciences department, download the LAMC 2022-23 College Catalog: STEM, Health, & Fitness portion for Life Sciences. (The programs offered through the Life Sciences department are highlighted in yellow.)
    - **Dr. Arora's Webpage**
    - **Biotech Website**

- **Career & Academic Pathways:** Los Angeles Mission College has developed Career & Academic Pathways (CAPs) to help guide you in achieving your academic goals. All academic programs offered through the college can be found in one of these 6 CAPs, with the STEM, Health, & Fitness CAP being the CAP you have chosen to follow based on your enrollment in this course. You can find more information on each of the Career and Academic Pathways (CAPs), and you can use the Program Mapper to provide more detailed information about the programs in each CAP.

- **STEM Office and counseling:** For information on resources, research opportunities, and transferring for STEM students visit the STEM Center website.
  Book a counseling appointment with one of the members of our STEM counseling team.

- **Honors Program:** Learn about the opportunities and benefits from the honors program.

- **Student Self-Orientation to Canvas:** Enroll in this shell for a Canvas Self-Orientation to become familiar with the features.

- **Transfer Center:** Learn about workshops and services provided by the Transfer Center.

- **Student Health Center:** For information of available services (including screenings, treatments, and therapy) and to make an appointment, call 818-362-6182, or find information at the Health Center website.

- **Extended Opportunity Programs and Services (EOPS)**: For appointments, eligibility and more information, call 818-364-7645 or visit the Extended Opportunity Programs and Services website.

- **Financial Aid:** For appointments, applications, and more information, call 818-364-7648 or visit the Financial Aid website.

- **Library:** For information on resources, workshops, and other services, call 818-364-7106 or visit the Library website. You can also live chat with a librarian there!

- **LACCD Student Distance Learning Resources:** You can enroll in the Distance Learning Resources shell for more support.

Important Dates to Remember

INSTRUCTION BEGINS.....August 28th
Labor Day.....September 4th
Deadline to add ..... October 21st
Deadline to DROP full-term classes without a "W" .....September 13th
Deadline to DROP full-term classes with a "W" grade.....October 8th
FINAL EXAMINATION..... **October 19th**

The following schedule is tentative. More or less time may be spent on each subject as necessary.
I reserve the right to make changes to the syllabus at any time.
Any such changes will be noted in class and in Canvas.

Tentative Schedule-Biotech-2. Fall 2023

Lecture: Mon, Wed. 8:00-10:10 AM (Remote, Synchronous)
Lab: Mon, Wed. 10:15-12:20 PM (Remote, Synchronous)
Lab: Tue, Thu**.** 8:00 AM-12:20 PM in CMS 106 (In-person)

WEEK	DATE	LECTURE TOPIC (textbook reading)
1	**Aug 28**	The Field of Biotechnology; Chemicals, Lab, Health & Safety, Biohazard Disposal
	LAB	Labster Labs Orientation
	Aug 29	**Lab Orientation,**
	LAB	**Lab Safety – Safety Data Sheets; Lab Responsibilities**
	Aug 30	Introduction to Chemistry, molecules and macromolecules; **Quiz-1 (Biotechnology)**
	LAB	Metric System, Laboratory Math, Practicing Laboratory Math,
	Aug 31	**Lab Notebook;**
	LAB	**Organizing Chemical Inventory**
2	**Sep 4**	***HOLIDAY***
	Sep 5	**Micropipetting,**
	LAB	**Making Solutions, Serial Dilutions; Percent and "X" Solutions**
	Sep 6	DNA & RNA **(OS 96-100),** Transcription, Translation **(OS 36-48);** Mutations **(OS 397-401)**
	LAB	**Labster Labs;** Molar Solutions, Calculations and Specific Solutions

	Sep 7	**Making buffers,**
	LAB	**Measuring and Adjusting pH**
3	**Sep 11**	Properties of Water & pH **(OS 49-56),** Carbohydrates **(OS 71-79),** Lipids **(OS 80-86)**
	LAB	Labster Labs
	Sep 12	**Making buffers,**
	LAB	**Measuring and Adjusting pH, Making Culture Media**
	Sep 13	Recombinant DNA: **QUIZ 2 (Transcription,Translation)**
	LAB	Labster Labs
	Sep 14	**Autoclaving and Making plates**
	LAB	**Preparation for Transformation**
4	**Sep 18**	Prokaryotes and Viruses, **(OS 110-112, OS 559-566); QUIZ 3 (Recombinant DNA),**
	LAB	Standard Operating Procedures (SOPs) Labster
	Sep 19	**Guest Speaker**
	LAB	**Bacterial Transformation, Agarose gel Electrophoresis**
	Sep 20	Amino Acids & Polypeptides **(OS 87-90)** Protein Structure **(OS 91-96),** Enzymes **(OS 187-194)**
	LAB	Labster Labs
	Sep 21	**Workshop-Bridge to Employment**
	LAB	**Checking Transformation, Inoculation techniques**
5	**Sep 25**	The Scientific Method; Upstream and Downstream Processes, **QUIZ 4 (Prokaryotes, viruses),**
	LAB	Labster Labs; Spectrophotometry: Beer's Law
	Sep 26	**spectrophotometry**
	LAB	**Measuring DNA & Protein Concentrations**
	Sep 27	Eukaryotic Cell Biology **(OS 109-126); QUIZ 5 (Upstream, Downstream),**
	LAB	*Restriction Enzyme Digestion of DNA: Labster Labs
	Sep 28	**Spectrophotometry**
	LAB	**Making Protein standard curve**
6	**Oct 2**	Microbial Growth
	LAB	Agarose Gel Electrophoresis of DNA; Aseptic Techniques
	Oct 3	**Aseptic Techniques**
	LAB	**Cell Culture, Fractionation of Milk, Centrifugation**
	Oct 4	Cell Division & DNA Replication **(OS 279-287, 392-394) Quiz 6 (Microbial Growth),**
	LAB	Labster Labs
	Oct 5	**Column Chromatography,**
	LAB	**ELISA**
7	**Oct 9**	**QC, QA and Validation;** Principles of Microscopy **(handout, OS 107-109)**
	LAB	Waste Water Testing
	Oct 10	**ELISA, Guest Speaker-President Emeritus, Grifols Biologicals.**
	LAB	**Microscopy, Gram Stain of Bacteria**
	Oct 11	Metrology – Calibration **QUIZ 7 (QC, QA),** Writing SOPs
	LAB	Following SOP, Labster Labs
	Oct 12	
	LAB	**Polymerase Chain Reaction**
8	**Oct 16**	**QUIZ 8 (Metrology),** Mutations **(OS 397-401)**
	LAB	Oral Presentation, CRISPR virtual lab
	Oct 17	**Lab Exam**
	LAB	Completing Lab Note Book
	Oct 18	***FINAL EXAM***
	LAB	**Complete Virtual Labs**
	Oct 19	**Grifols Field Trip**