

Los Angeles Mission College  
Biotech-3 – Sections 17944 & 17945

## Biotechnology II

Syllabus, Fall 2023  
10/23/23 – 12/17/23

**Instructor:** *Chander Arora, Ph.D*  
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**Phone & Voicemail:** (818) 364-7753

**Office Hours: Open: Mon, 7:00am-7:45am, Wed, 7:00am-7:45am (Zoom)**

**Tues, Thurs: 12:20pm-1:20pm in CMS 106 or by appointment**

**Or By appointment on zoom (Mon, 1:00pm - 3:35pm).**

**Lecture:** Mon, Wed. 8:00 AM-10:05am (Remote, Synchronous)

**Lab:** Mon, Wed. 10:15-12:20pm (Remote, Synchronous)

**Lab:** Tue, Thu. 8:00 AM-12:25pm in CMS 106 (In-person)

**Prerequisites:** Biotech-2

**Advisories:** This course is not CSU transferrable

**Articulation:** Please see [www.assist.org](http://www.assist.org) for information regarding articulation agreements.

### Student Learning Outcomes:

1. Employ mathematical skills and knowledge of chemistry to accurately prepare an aqueous solution with the desired chemical concentrations and pH.
2. Examine and apply the fundamentals of cellular and molecular biology concepts to biotechnology research and its practical applications.
3. Develop and maintain laboratory records according to standard scientific and industrial guidelines.

### Course Description:

*Biotech 3* expands concepts and techniques introduced in Biotechnology I. Students are introduced to modern molecular biology techniques, including nucleic acid isolation, recombinant DNA techniques, cell transformation, recombinant DNA analysis, nucleic acid hybridization, and DNA sequence analysis. Students explore the production and purification of proteins using biochemical techniques such as immunochemistry and chromatography.

### Course Objectives:

- By the end of this course each student should be proficient in:
- Applying principles of bio-safety and lab safety.
- Keeping accurate records with sufficient information to reproduce what was done.
- Basics of current technology, products, and careers in the fields of biotechnology.
- Applying concepts of chromatography, cell culture and introduction to advanced biotechnology techniques like gene microarray and Enzyme-Linked Immunosorbent Assay (ELISA).
- Applying core principles of centrifugation and spectrophotometry.

- Applying aseptic technique in the culturing of microorganisms.
- Oral and written communication, maintaining a professional work ethic, and good team dynamics.

### Required Texts:

- **Open Stax – Open Stax – Biology, Clark et al 2018, (ISBN-13: 978-1-947172-52-4) available for free download at: <https://openstax.org/details/books/biology-2e>**

### Recommended books:

- Biotechnology: A laboratory Skills Course, J. Kirk Brown 2018 (ISBN-13:978-0-9832396-3-5)
- Methods in Biotechnology, SB Hong, MB Rashid, LZ Santiago-Vazquez 2017 (ISBN-13:978-1-119-15678-9)
- **MATERIALS:** bound lab/computation notebook (graph ruled), *Sharpie* pen (black fine & regular point), ball point blue or black pen, scientific calculator.

## Evaluation and Grading

### Lecture and Lab: Project Based Learning

This course entails Project Based Learning. Attendance is mandatory to maintain the continuity of the project. Lectures would include course material, soft skills and participation. Labs would include a team project including planning, implementation, execution and presentation of the project.

### Exams

There would be one written exam for 20% of your grade on basic lab calculations, procedures and techniques discussed in the class.

Lab work and Final Project account for 70% of your final grade. There will be final Presentation on **Thursday, Dec. 14<sup>th</sup>, 20223 from 9-11 AM**. Please make personal, family and work plan accordingly.

### Soft Skills and Participation

Guidelines would be provided to work on your resume and interview skills. Your resumes would be reviewed and finalized before your presentations.

Assignments and participation account for 10% of your final grade. This includes team work, communication and reflections on your learning. Reflections will be submitted weekly via Canvas or as exit tickets every Thursday.

### Literature review, Standard Operating Procedure (SOP) and team work

- The literature review about your project, writing and following Standard Operating Procedure (SOP) and team work for your group project will account for 20% of your grade. There will be assignments that include class exercises and written assignments intended to develop these skills. This could be a continuation of a series of labs and exercises in the previous course

### Lab Experiments, data recording & analysis and Lab Safety

- Lab work on your assigned project, data recording, data analysis and daily Lab Safety would account for 30% of your grade.
- 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. You will learn to conduct a variety of observations and measurements using multiple types of lab tools and instruments.
- Lab exercises and performance will account for 10% of your grade.
- 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*.

### Project and Oral Presentation

Project and Oral Presentation to your class and faculty will account for 10% of your final grade. Science requires research, critical thinking and effective communication skills. You will research and support your experimental findings. For the project Poster, you will write an introduction and discussion supporting your results. In addition to the written project, you would also present it to the class for 5-10 min. More information will be given in class and posted on the course Canvas page. The final poster presentation and project is due on **Monday, Dec. 11<sup>th</sup>, 2021**.

### 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:

<b>Lecture:</b>	
Soft Skills/Participation	50 pts
Written Exam	100 pts
<b>Lab:</b>	
Literature Review & SOP, team work	100 pts
Lab Experiments, data, Lab safety	150 pts
Poster and Oral Presentation	100 pts
<b>Total Points:</b>	<b>500 pts</b>

#### B. Percent Distribution:

Lect/Lab	Activity	Percent
Lecture (30%)	Soft Skills and Participation	10
	Exam	20
Lab (70%)	Literature Review & SOP	20
	Lab Experiments	30
	Poster and Oral Presentation	20

### C. Letter Grade:

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

### ATTENDANCE POLICY

*Attendance and timeliness are an extremely important for this course, specifically your “soft skills” score 10 % of the course points!* These are easy points provided you **come to class, on time, interact well with your instructor and fellow students, and conduct yourself appropriately in the laboratory.** This part of the course is weighted so heavily because these skills are essential for success in the real world (i.e., a job!), not just this course. If you are unable to attend for any reason, please let me know and remember you are responsible for any information, date changes, etc., presented in class, whether or not you are present. Also, keep in mind the following important dates for the courses:

- Last day to add (with a permission code from the instructor) is **December 16<sup>th</sup>**.
- *Students dropping the class must do so by:*
- **Wednesday, November 8<sup>th</sup>** to receive a refund and avoid a “W”.
- **Sunday, December 3<sup>rd</sup>** to receive a “W”.
- **Friday, October 27<sup>th</sup>** to receive a refund/no fee owed.

\* Keep in mind the LACCD website is not always available on Sundays due to routine maintenance.

**Canvas and Email:** <https://ilearn.laccd.edu/login/canvas>

The course Canvas page is the primary method by which you will receive announcements, reminders, assignments, handouts, reading assignments, additional readings, PowerPoint slides, lab exercises, assignments, and additional resources for the course. You'll submit some assignments via Canvas and we will also use it as a forum for discussion outside of the classroom as well. **Canvas** and your **Mission email address** are the most important means of communication for the course so you should be in the habit of checking them **daily**. You are responsible for printing lecture slides, class exercises, labs, assignments etc. Print your name backwards on the syllabus agreement page print line before turning it in.

### 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.

### **Important Dates to Remember**

INSTRUCTION BEGINS.....	October 24 <sup>th</sup>
Deadline to add .....	December 16 <sup>th</sup>
Deadline to DROP the class without a “W” .....	November 8 <sup>th</sup>
Deadline to DROP the class with a “W” grade.....	December 3 <sup>rd</sup>
Deadline to receive refund/no fee owed.....	October 27 <sup>th</sup>
<b>FINAL Presentation.....</b>	<b>December 14<sup>th</sup></b>
<b>FINAL EXAMINATION.....</b>	<b>December 11<sup>th</sup></b>

**\*\*\*The goal of these biotech courses is for you to find a job, so be sure to act accordingly\*\*\***

### **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.**

***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-3 - Fall 2023

WEEK	DATE	TOPIC (Textbook reading)
1	Oct 23	<b>Project Base Learning: Overview of the course and objectives;</b> Scientific Method.
	<i>LAB</i>	Labster Simulated Labs, Team building, Project Assignment
	Oct 24	<i>SOP writing- team dynamics and member responsibilities, Effective Communication</i>
	Oct 25	<b>PCR and qPCR,</b>
	<i>LAB</i>	SOP practice, Literature review tips for the projects, making a flow chart
2	Oct 26	Finalizing Projects and titles for each group. <i>Time Management</i>
	Oct 30	<b>Enzyme Linked Immuno- Sorbent Assay</b>
	<i>LAB</i>	<i>Discussion by project team leaders, Prepare for Gallery walk</i>
	Oct 31	Flow chart, Gallery walk and Preparation for lab experiments
	Nov 1	<b>Chromatography</b>
	<i>LAB</i>	Project -discussions, Progress evaluation <i>Experimental plan each group</i>
3	Nov 2	Preliminary lab experiments
	Nov 6	<b>CAR-T Cell Therapies</b>
	<i>LAB</i>	Project experiments plan by each team
	Nov 7	<b>Bridge to Employment-Carlos Maldonado-Cedars-Sinai, Project lab work</b>
	Nov 8	<b>Fractionation of Proteins</b>
	<i>LAB</i>	<b>Soft Skills: Taking notes.</b> Interaction between different teams and exchange of ideas
4	Nov 9	Experimental plan, trial experiments. <b>Guest Speaker Alana Butler from Takeda</b>
	Nov 13	Project lab work plan, Writing 'Methods and Materials' for a project
	<i>LAB</i>	Interview skills, Experiments initiated for the week <i>Question/ Answers, Group Discussions</i>
	Nov 14	Project lab experiments, <b>Guest Speaker, Manjula Gunawardana</b>
	Nov 15	Lean Process, Principles of Centrifugation
	<i>LAB</i>	<b>Reading comprehension for scientific articles,</b> Project discussion, planning lab work
5	Nov 16	Continuing experiments, <b>Guest Speaker- Willie Zuniga,</b>
	Nov 20	Team work to review poster progress on template
	<i>LAB</i>	<i>Data review, Lab book organization, revision with team</i>
	Nov 21	Finish lab work, Review and discussion of data tables and graphs
	Nov 22	SDS-Gel Electrophoresis
6	<i>LAB</i>	<i>Review and revise the process, Discussion of next lab work <b>Soft Skills: Attitude</b></i>
	Nov 23	<b>Thanksgiving Holiday</b>
	Nov 27	Presentation tips and techniques
	<i>LAB</i>	Finalizing and plotting results, Window- pane analysis of projects by each team
	Nov 28	Rerun of lab work for projects
	Nov 29	Upstream and Downstream process
7	<i>LAB</i>	<i>Completing results and discussion of results- first draft on poster template</i>
	Nov 30	Final Poster templates for printing
	Dec 4	Tips and rehearsals for poster presentation
	<i>LAB</i>	Finalizing posters and presentations, Checking SOP, Pre and Post Procedure
	Dec 5	Finishing lab work, clean up
	Dec 6	Discussion on presentation by each member
	<i>LAB</i>	Finish Lab Notes, Finalize Project SOP
Dec 7	<i>Review Final Exams</i>	
8	Dec 11	<b>Lecture Final Exam</b>
	<i>LAB</i>	Finalizing posters and presentations, Checking SOP, Pre and Post Procedure
	Dec 12	<b>Lab Final Exam</b>
	Dec13	Discussion on presentation by each member
	<i>LAB</i>	Practice final POSTER PRESENTATION,
	Dec 14	<b>9:00-11am FINAL PRESENTATIONS</b>

All Course files are available on Canvas

## Industry Interviews

Tuesday, Dec. 5<sup>th</sup>, Grifols Interviews on Campus

### 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.