

Los Angeles Mission College
Biotech-2 – Sections 19975 & 19976
Biotechnology I
Syllabus, Fall 2019

Instructor: *Chander Arora, Ph.D.*

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Office Hours: Mon-12:30PM-3:35PM, Tue-1:30PM-4:00PM
or by appointment in CMS 225.

Lecture: Mon-Thurs 8:00-9:00 AM in CMS 106

Lab: 9:10-12:20 PM in CMS 106

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 2018, (ISBN-13: 978-1-947172-52-4) available for free download at: <https://openstax.org/details/books/biology-2e>**
- **MATERIALS:** bound lab/computation notebook (graph ruled), *Sharpie* pen (black fine & regular point), ball point blue or black pen, scientific calculator, lab coat, three 882-E Scantrons

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, Oct. 17th 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 team work, 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 discussing 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 Tuesday, March 26th.

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 two lab exams. The lab exam-1 and lab exam-2 will account for 20% of your final grade. The lab exam-2 consists of two portions, one group and one individual.

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 Exam-1	50 pts
Lab Exam-2:	50 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

Attendance and timeliness are an extremely important for this course, specifically your “soft skills” score – 8 % 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 **Tuesday September 3rd**
- *Students dropping the class must do so by:*
- **Tuesday September 3rd** to receive a refund and avoid a “W”
- **Sunday October 6th** to receive a “W”

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

NOTE: *You are limited to **3 attempts per course**. Receiving a grade or “W” for a course counts as an attempt, regardless of when the course was taken. Withdrawal by September 3rd (avoiding a “W”) will not count as an attempt.*

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.

Code of Honor and Integrity

Los Angeles Mission College

Department of Life Sciences

Students at Los Angeles Mission College, because they are members of an academic community dedicated to the achievement of excellence and the pursuit of honor, are expected to meet high standards of personal, ethical, and moral conduct. These standards require personal integrity and a commitment to honesty without compromise. Without the ability to trust in these principles, an academic community and a civil society cannot exist. Los Angeles Mission College students and faculty are as committed to the development of students with honesty and integrity as they are to the academic and professional success of its students.

The **Code of Honor and Integrity** is an undertaking of the students, first and foremost, both individually and collectively, that they will:

1. not give or receive dishonorable aid during exams, quizzes or assignments

- do their share and take an active part in seeing to it that fellow students, as well as themselves, uphold the spirit and letter of the Code of Honor and Integrity.

Some examples of conduct that are regarded as being in violation of the Honor Code include:

- Copying from another’s examination or quiz, or allowing another to copy from one’s own papers
- Using any unpermitted source of information, human or other, during an exam, quiz or assignment that influences the grade; this includes the use of technological devices
- Any student-to-student collaboration that is unpermitted
- [Plagiarism](#) (plagiarism is defined as the use, without giving reasonable and appropriate credit to, or acknowledging the author or source, of another person's original work)
- Representing as one’s own work as the work of another
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid is not permitted

As a part of the effort to promote an environment of honesty and integrity during quizzes and examinations, the following guidelines will apply for any courses in the Department of Life Sciences:

- Students will leave all books and all other non-essential items (e.g. paper, electronic devices) on the floor so that they are not useable nor block the sight line between professor and student. No electronic devices will be in reach.
- Students will not communicate in any way that will dishonorably assist themselves or another student.
- Students will leave the room during an exam only if permitted by the professor’s policy. If permitted, only one student may leave the room at any time and be gone for only the average length of time needed for the stated purpose. Students will leave all purses, bags, books, phones, jackets, etc., in the classroom during the absence.
- Students will promote the spirit and letter of the **Code of Honesty and Integrity** by dissuading fellow students from dishonest activity and, when such casual persuasion does not work, informing the professor of the possible dishonest activity, either anonymously, or otherwise.
- Students will make every effort to avoid even the appearance of dishonesty or lack of integrity

Violation of this policy will not be tolerated and violators will be subject to severe penalties. The success of the **Code of Honor and Integrity** is based upon the collective desire of students, faculty and the community to live in an environment that embraces respect for that which is right – both in the college and in society as a whole.

Important Dates to Remember

INSTRUCTION BEGINS.....	August 26 th
Labor Day.....	September 2 nd
Deadline to add	September 3 rd
Deadline to DROP full-term classes without a “W”	September 3 rd
Deadline to DROP full-term classes with a “W” grade.....	October 6 th
FINAL EXAMINATION	October 17th

RECOMMENDATIONS FOR SUCCESS

Think of this class as a job, a job you really want to keep. Here are some suggestions:

- *be on time and stay in class until dismissed*
- do **NOT** fall behind in the course, schedule time to study on a regular basis
- do **all** the assignments and turn them in **on time**
- *use the tutors and/or instructor (office hours) for any help you may need*
- take **organized** notes, this will help you to mentally organize what you are learning
- **know the terminology** – it's hard to be successful if you don't
- at a **minimum, learn** each concept **3 times** to retain it well for the exams and quizzes:
 - 1) **comprehend** the class material during the lecture
 - 2) *read the corresponding material in the text or handouts*
 - 3) **review** your notes and terminology

*****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 week of the course and I will accommodate you if at all possible. For accommodations due to disability, you must consult the Disabled Student Programs and Services office after which we will abide by their recommendations.

**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 2019		
WEEK	DATE	LECTURE TOPIC (textbook reading)
1	Aug 26	The Field of Biotechnology, Biomanufacturing
	<i>LAB</i>	<i>Lab Orientation – Map the Lab</i>
	Aug 27	Chemicals, Lab, Health & Safety, Biohazard Disposal
	<i>LAB</i>	<i>Lab Safety – Safety Data Sheets; Lab Responsibilities, Chemical Inventory</i>
	Aug 28	Introduction to Chemistry, molecules and macromolecules
	<i>LAB</i>	<i>Lab Notebook; Organizing Chemical Inventory</i>
2	Aug 29	Quiz-1 (Biotechnology); Laboratory Math
	<i>LAB</i>	<i>Practicing Laboratory Math</i>
	Sep 2	<i>HOLIDAY</i>
	Sep 3	DNA & RNA (OS 96-100), Transcription, Translation (OS 36-48)
	<i>LAB</i>	<i>Micropipetting, Making Solutions</i>
	Sep 4	Properties of Water & pH (OS 49-56)
<i>LAB</i>	<i>*Measuring and Adjusting pH</i>	

	Sep 5	QUIZ 2 (Transcription, Translation): The Scientific Method (OS 9-16)
	LAB	*Percent and "X" Solutions
3	Sep 9	Metrology
	LAB	Metrology – Weight, Distance, Temperature, Calibration
	Sep 10	Recombinant DNA, Creating Protein of interest
	LAB	*Volume/Volume & Mass/Volume Solutions
	Sep 11	Carbohydrates (OS 71-79), Lipids (OS 80-86)
	LAB	*Molar Solutions, Calculations and Specific Solutions
	Sep 12	QUIZ 3 (Recombinant DNA), Amino Acids & Polypeptides (OS 87-90)
	LAB	*Making pH Buffered Solutions
4	Sep 16	Prokaryotes and Viruses, (OS 110-112, OS 559-566)
	LAB	*Making Serial Dilutions*Lab Math; *Standard Operating Procedures (SOPs)
	Sep 17	Protein Structure (OS 91-96)
	LAB	PRACTICAL EXAM 1
	Sep 18	Enzymes (OS 187-194)
	LAB	Bacterial Media Preparation
	Sep 19	QUIZ 4 (Prokaryotes, viruses), Notes taking in Science class
	LAB	Lab book organization, revision with team
5	Sep 23	Upstream and Downstream Processes, Principles of Centrifugation (handout)
	LAB	*Centrifugation – Precipitation of DNA
	Sep 24	Spectrophotometry (handout)
	LAB	*Spectrophotometry: Measuring DNA & Protein Concentrations
	Sep 25	Restriction Enzymes, Gel Electrophoresis (handout)
	LAB	*Restriction Enzyme Digestion of DNA
	Sep 26	QUIZ 5 (Upstream, Downstream), Spectrophotometry: Beer's Law
	LAB	Making Protein standard curve
6	Sep 30	Microbial Growth
	LAB	Agarose Gel Electrophoresis of DNA
	Oct 1	Eukaryotic Cell Biology (OS 109-126)
	LAB	Aseptic Techniques: Inoculation of Bacteria
	Oct 2	Cell Division & DNA Replication (OS 279-287, 392-394)
	LAB	Aseptic Techniques: Analysis of Cultures, Determining Bacterial Concentrations
	Oct 3	Quiz 6 (Microbial Growth), Principles of Microscopy (handout, OS 107-109)
	LAB	Bacterial Growth Curve
7	Oct 7	QC, QA and Validation
	LAB	Waste Water Testing
	Oct 8	Gene Expression – Translation (OS 424-429)
	LAB	Gram Stain of Bacteria
	Oct 9	QUIZ 7 (QC, QA), Writing SOPs
	LAB	Following SOP
	Oct 10	PRACTICAL EXAM 2
	LAB	Water testing Validation
8	Oct 14	QUIZ 8 (Metrology), Mutations (OS 397-401)
	LAB	GFP Project/ Quadrant Streaks of Bacteria
	Oct 15	Bioethics, Oral Presentations on biotech company
	LAB	GFP Project observation/ Oral Presentations on biotech company
	Oct 16	Review
	LAB	Centrifuge & Freeze Bacterial pellets
	Oct 17	FINAL EXAM

NOTE: ALL reading assignments are to be completed before the corresponding lecture or lab.

All Course files are available on Canvas

DSP&S Accommodations

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.

Los Angeles Mission College Resources

Life Science Department website: www.lamission.edu/lifesciences

Dr. Arora's Webpage: <http://www.lamission.edu/~arora>

Biotech Website: <https://www.lamission.edu/Biotechnology/Home.aspx>

Canvas: <https://ilearn.laccd.edu/>

STEM Office: For information on **free tutoring**, resources and academic counseling for STEM (Science, Technology, Engineering, and Technology) students visit the STEM Center in CMS 014.

<http://www.lamission.edu/stem>

Tutoring Services in Learning Center: Laboratories for Learning, Writing, Math & Science. Walk-in and appointment services offered. Call 818-364-7754 or visit www.lamission.edu/learningcenter/

Library: For information on hours, resources, workshops, and other services contact 818-364-7106 or visit <http://www.lamission.edu/library/>

Disabled Students Programs and Services (DSP&S): For appointments, eligibility and information call 818-364-7732 or visit <http://www.lamission.edu/dsps/>

Extended Opportunity Programs and Services (EOPS): For appointments, eligibility and information call 818-364-7645 or visit <http://www.lamission.edu/eops/>

Assessment Center: Offers student assessments in English, English-as-a-Second-Language (ESL) and Mathematics. Please contact the Assessment Center at (818) 364-7613 for more information or visit <http://www.lamission.edu/assessment/>

Bookstore: For hours of operation, book availability, buybacks, and other information call 818-364-7767, or x7768, or visit <http://www.lamissionbookstore.com/>

Counseling Department: For appointments and information call 818-364-7655 or visit <http://www.lamission.edu/counseling/>

Admissions and Records: Students can register for classes, request transcripts, file petitions for graduation, and drop classes at this office. For more information call 818-833-3322 or visit: <http://www.lamission.edu/admissions/>

Financial Aid: For information and applications call 818-364-7648 or visit <http://www.lamission.edu/financialaid/>