Los Angeles Mission College

Biotech-3 – Sections 19977 & 19978

Biotechnology II

Syllabus, Fall 2019

Instructor: *Chander Arora, Ph.D.*
Email: aroracp@lamission.edu
Phone & Voicemail: (818) 364-7753
Office Hours: 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 AM-12:20 PM in CMS 106

Prerequisites: None
Advisories: This course is not CSU transferrable
Articulation: Please see 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, lab coat, 882-E Scantron.

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. 12th,2019 from 8-10 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 Thursday, Dec. 12th.

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

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 **Monday October 28th**
- *Students dropping the class must do so by:*
  - **Monday October 28th** to receive a refund and avoid a "W"
  - **Sunday December 1st** 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 October 28th (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

2. 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:

1. 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.

2. Students will not communicate in any way that will dishonorably assist themselves or another student.

3. 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.

4. 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.

5. 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……October 21st
Deadline to add ……October 28th
Deadline to DROP full-term classes without a "W" …… October 21th
Veteran's Day Holiday…… November 11th
Thanksgiving Holiday …… November 28th
Deadline to DROP full-term classes with a "W" grade…… **December 1st**
FINAL EXAMINATION…… **December 12th**

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*
- make it a habit to use safe lab practices and write down your daily lab notes, this will help you to mentally organize what you are learning and executing
- **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.
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Tentative Schedule-Biotech-3. Fall 2019

WEEK	DATE	LECTURE TOPIC (textbookreading)
1	**Oct 21**	Project Base Learning: Overview of the course and objectives; Project Assignment
	LAB	Lab Orientation – Map the Lab, work on team dynamics and member responsibilities
	Oct 22	Field trip to Grifols Pharmaceuticals
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	Oct 23	Scientific Method: Project preview and discussion for each group
	LAB	Discussion by project team leaders, Gallery walk
	Oct 24	**Fractionation steps and process**
	LAB	Resume writing presentation and assignment
2	**Oct 28**	Literature review tips for the projects, making a flow chart
	LAB	Gathering supplies and Making solutions
	Oct 29	Bacterial genetics and transformation
	LAB	Calculations and making solutions
	Oct 30	Water testing and Bioburden
	LAB	Preliminary run of the experiment-each group
	Oct 31	Cover letter writing
	LAB	Checking and Troubleshooting lab calculations
3	**Nov 4**	Genetic Recombination and Diseases
		Project work by each team
	Nov 5	**Enzyme Linked Immuno- Sorbent Assay**
	LAB	Project -discussions, Progress evaluation
	Nov 6	Reproducibility of experiments; Spectrophotometry: Beer's Law
	LAB	Interaction between different teams and exchange of ideas, continued lab work
	Nov 7	**Soft Skills: Resume draft-1,** Stock solutions and storage
	LAB	Continuing experiments and storing the material for next week
4	**Nov 11**	**Holiday**
	LAB	**Holiday**
	Nov 12	Guest speaker 'Willie Zuniga' from Grifols
	LAB	Question/ Answers, Discussion, Project work
	Nov 13	Writing 'Methods and Materials' for a project
	LAB	Inoculation, Streaking and incubating plates, Making slants
	Nov 14	**Reading comprehension for scientific articles**
	LAB	***Data review, Lab book organization, revision with team***
5	**Nov 18**	Upstream and Downstream Processes, Principles of Centrifugation
	LAB	*Centrifugation – Precipitation of DNA, Fractionation of Protein
	Nov 19	PCR and qPCR
	LAB	Sample preparation, running qPCR
	Nov 20	SDS-Gel Electrophoresis
	LAB	*Restriction Enzyme Digestion of DNA, Protein measurement of fractions
	Nov 21	**Soft Skills: Resume draft-2, Preparation for Interview,**
	LAB	Continue with project experimental procedures, discussion
6	**Nov 25**	Presentation tips and techniques
	LAB	Review of results for each project
	Nov 26	Window- pane analysis of projects by each team
	LAB	Continue with project experimental procedures, Preliminary results
	Nov 27	**Upstream and Downstream process**
	LAB	Window pane analysis projection for each project
	Nov 28	**Holiday**
	LAB	**Holiday**
7	**Dec 2**	**Tabulation and analysis of data**
	LAB	Practicing tabulation and analysis
	Dec 3	Essentials for Discussion of results, data validation

	LAB	Completing results and discussion of results
	Dec 4	**Review of results and discussion**
	LAB	**Checking** SOP, Pre and Post Procedure
	Dec 5	**Review of Student presentation,** Making poster on the poster template
	LAB	Student Presentation to the class and faculty for input,
8	**Dec 9**	Practice POSTER PRESENTATION
	LAB	Mock Interviews
	Dec 10	First Interview by Grifols
	LAB	First Interview by Grifols
	Dec 11	***Written FINAL EXAM***
	Dec 12	***FINAL* POSTER PRESENTATION**

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
Biology 3 Website: http://www.lamission.edu/lifesciences/Biology3Laboratories.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/