Los Angeles Mission College, Spring 2019 (Symlar HS)
Lecture: TTh 11:50-12:50
Lab: TTh 1:00-3:00
office hours: 3:00-3:30 in the lab

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BIOTECH 2 (sections 28289 & 28290)

PREREQUISITES: ***none***

ARTICULATION: This course is CSU transferrable.

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.
3. Employ mathematical skills and knowledge of chemistry to accurately prepare an aqueous solution with the desired chemical concentrations and pH.

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 BOOKS AND MATERIALS

Open Stax – Biology, Rye et al 2018, 2e (ISBN-13: 978-1947172524) available for free download at: https://openstax.org/details/books/biology-2e

Introduction to Biotechnology, Thiemann and Palladino, 4e (ISBN 13: 978-0135186015, optional)

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

COURSE GRADE

Point Distribution:

9 Quizzes	**18% of Grade (180 points)**
Midterm & Final Exams	**20% of Grade (200 points)**
Oral Presentation	**4% of Grade (40 points)**
2 Lab Practical Exams	**20% of Grade (200 points)**
Homework	**18% of Grade (180 points)**
Lab Notebook	**10% of Grade (100 points)**
"Soft Skills"	**10% of Grade (100 points)**
	TOTAL 1000 points

Grading Scale:

900+ pts (90-100%)	**A**
800-899 pts (80-89%)	**B**
700-799 pts (70-79%)	**C**
600-699 pts (60-69%)	**D**
0-599 pts (below 60%)	**F**

RECOMMENDATIONS FOR SUCCESS

The main purpose of this class is to help prepare you for employment in the biotechnology industry, so think of this class as a job you really want to keep. Here are some suggestions:

- be on time, stay in class until dismissed
- do **NOT** fall behind in the course, study on a daily basis
- do the assigned reading and turn in assignments on time
- get help when you don't understand something
- take notes, this will help you to mentally organize the material you will be learning
- **know the terminology**
- at a **minimum**, **learn** each concept **3 times** in order to retain it well for the exams and quizzes:

  1) **comprehend** the class material during the lecture
  2) **read** the corresponding material in the texts
  3) **review** your notes and terminology

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

IMPORTANT WEBSITES

https://ilearn.laccd.edu/login/canvas

-here you can monitor your scores and standing in the course, communicate with your instructor and fellow students, and **submit assignments electronically**

http://www.lamission.edu/~brownst

- your instructor's website where you can download course notes and various handouts

Biotech 2 COURSE SCHEDULE – Spring 2019

(tentative)

"**OS"** refers to pages in the Open Stax Biology textbook

WEEK	DATE	LECTURE TOPIC (textbook reading)
1	**Feb 5**	The Field of Biotechnology
	LAB	Lab Orientation
	Feb 7	Lab Safety
	LAB	Lab Safety – Safety Data Sheets
2	**Feb 12**	Documentation
	LAB	Lab Notebook; Making Yogurt (handout)
	Feb 14	**QUIZ:** Laboratory Math
	LAB	*Lab Math; *Standard Operating Procedures (SOPs)
3	**Feb 19**	Metrology
		Metrology – Measuring Weight, Distance & Temperature
	Feb 21	Atomic & Molecular Structure **(OS 36-48)**
	LAB	Metrology – Measuring Volume
4	**Feb 26**	**QUIZ:** Properties of Water & pH **(OS 49-56)**
	LAB	*Measuring and Adjusting pH
	Feb 28	The Scientific Method **(OS 9-16)**
	LAB	*Percent and "X" Solutions
5	**Mar 5**	Macromolecules & Polymers **(OS 56-62, 70-71)**
	LAB	*Volume/Volume & Mass/Volume Solutions
	Mar 7	**QUIZ:** Carbohydrates **(OS 71-79)**
	LAB	*Molar Solutions
6	**Mar 12**	Lipids **(OS 80-86)**
	LAB	*Making pH Buffered Solutions
	Mar 14	Amino Acids & Polypeptides **(OS 87-90)**
	LAB	*Making Serial Dilutions
7	**Mar 19**	**QUIZ:** Protein Structure **(OS 91-96)**
	LAB	***PRACTICAL EXAM 1***
	Mar 21	Enzymes **(OS 187-194)**
	LAB	Bacterial Media Preparation
8	**Mar 26**	**QUIZ:** Nucleic Acids – DNA & RNA **(OS 96-100)**
	LAB	***FIELD TRIP - TBD***
	Mar 28	***Non-Instructional Day (no class)***

9	**Apr 2**	Principles of Centrifugation **(handout)**
	LAB	*Centrifugation – Precipitation of DNA
	Apr 4	***MIDTERM EXAM***
	LAB	*Spectrophotometry: Measuring DNA Concentrations
10	**Apr 9**	Spectrophotometry **(handout)**
	LAB	Spectrophotometry: Measuring Protein Concentrations (Bradford Assay)
	Apr 11	Restriction Enzymes, Gel Electrophoresis **(handout)**
	LAB	*Restriction Enzyme Digestion of DNA
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11	**Apr 23**	**QUIZ:** Prokaryotic Cell Biology & Viruses **(OS 110-112, OS 559-566)**
	LAB	Agarose Gel Electrophoresis of DNA
	Apr 25	Eukaryotic Cell Biology **(OS 109-126)**
	LAB	Aseptic Techniques: Inoculation of Bacteria
12	**Apr 30**	**QUIZ:** Cell Division & DNA Replication **(OS 279-287, 392-394)**
	LAB	Aseptic Techniques: Analysis of Cultures, Determining Bacterial Concentrations
	May 2	Principles of Microscopy **(handout, OS 107-109)**
	LAB	Gram Stain
13	**May 7**	Gene Expression – Transcription **(OS 407-411, 413-415)**
	LAB	Eukaryotic Cell Culture
	May 9	**QUIZ:** Gene Expression – Translation **(OS 424-429)**
	LAB	Open Lab
14	**May 14**	***PRACTICAL EXAM 2***
	LAB	***PRACTICAL EXAM 2***
	May 16	Mutations **(OS 397-401)**
	LAB	Viewing & Quantitating Eukaryotic Cells
15	**May 21**	**QUIZ:** *Resume & Interview Skills
	LAB	GFP Project/Crime Scene DNA Prep: Quadrant Streaks of Bacteria
	May 23	Bioethics & Quality
	LAB	GFP Project/Crime Scene DNA Prep: Inoculate Small Overnight Cultures
16	**May 28**	Oral Presentations on biotech company
	LAB	GFP Project/Crime Scene DNA Prep: Scale Up & Induce Cultures
	May 30	***FINAL EXAM***
	LAB	GFP Project/Crime Scene DNA Prep: Centrifuge & Freeze Bacterial Pellets

QUIZ: A short 20 point quiz will be given at 11:00 sharp.

*This lab has a homework assignment that is due the next class meeting.

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

Course files are available for download on my web page or in Canvas:

http://www.lamission.edu/~brownst/915

https://ilearn.laccd.edu/login/canvas