

LOS ANGELES TRADE TECH COLLEGE

Fall 2015

BIO TECH 010, Section 4079, 4 Units

PREREQUISITES: No prerequisites required.

DESCRIPTION: This course describes a detailed study of the manufacture of biopharmaceuticals/biologics from industrial techniques within the biotechnology field. Special topics include the background, main areas and regulations of biomanufacturing, the basic biology and chemistry as it applies to the manufacture of biological products, and procedures, proper techniques, and documentation of the biomanufacturing process.

STUDENT LEARNING OBJECTIVES:

1. Students will demonstrate an understanding of the purpose, fundamentals and regulations of biomanufacturing.
2. Students will understand the science underlying biomanufacturing.
3. Students will apply techniques and procedures applicable to biomanufacturing.
4. Students will perform experiments in the laboratory to illustrate these concepts following safety practices in the laboratory.

INSTRUCTOR: Manuel Acosta, M.S.

CONTACT INFORMATION: e-mail: acostam2@lattc.edu

OFFICE HOURS: Mon - Thur: 4:30 – 6:00 pm, Sat: 7:00 – 7:30 am & 2:30 – 3:00 pm Cedar Hall, K-464/K-423

LECTURE SECTION: Sat 7:30 am – 10:35 pm, Magnolia Hall (Bldg MH), Room 301

LABORATORY SECTION: Sat 11:15 am – 2:25 pm, Cedar Hall (Bldg K), Room 464

REQUIRED TEXT: Lecture section – *Introduction to Biomanufacturing, 1st edition* by Northeast Biomanufacturing Center and Collaborative (NBC2)

Laboratory section – Lab Handouts for experiments will be given free of charge.

REQUIRED MATERIALS: Lab coat, Safety Goggles, Bound Laboratory Notebook, and Scientific Calculator only (No cell phones or programmable/graphing calculators).

READING & HOMEWORK: You should attempt to **read** the assigned chapters **before** the related topic is covered in lecture. Suggested homework problems are assigned at the beginning of each week. Homework is turned in at the beginning of class the day of the exam and will be checked for completion. *It is your responsibility to do (at least) the assigned homework in order to master the material covered.* The more problems you do, the more you will learn. It is in your best interest to do as many problems as possible (including ones not assigned). Allocate ~ 8 hours of independent study per week for this course.

EXAMINATIONS: Three exams are tentatively scheduled for **Saturday, September 26, October 24, and November 21, 2015** during the first half of the regular lecture time slot. The 2-hour Final Exam is scheduled for **Saturday, December 19, 2015 @ 7:30 am – 9:30 am; site to be determined. No make-up exams will be given.** Students that foresee an absence due to work schedule, medical issue, or religious holiday will have to take the exam before the scheduled exam date. **If by chance a make-up is allowed, there will be a 10% penalty added to the exam. NO ONE** will be permitted to take the final exam either earlier or later than the scheduled time, and no one can receive a passing grade for the course without taking the final exam! Cell phones are not allowed during exam.

LABORATORY: The laboratory schedule is in the syllabus. Each week's experiment(s) is designed to give the student practical experience in the biomanufacturing process. You are expected to have read each week's experiment(s) before attending lab section. The post-laboratory report and calculations are due 1½ week after completion of lab. Failing to attend and complete **THREE (3)** or more laboratories will result in a lab course grade of "F". Make-up lab policy will be discussed during the first lab meeting.

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GRADING: The final grade in the course will consist of the following: homework assignments (10%), the sum of all three exam scores (30%), the laboratory grade (30%), and the final exam (30%).

Homework Assignments (10%) + Exams (30%) + Lab (15%) + Lab Performance (15%) + Final (30%) = Total(100%)

The final letter grades will be assigned according to the following scale:

A (90–100%) B (80–89%) C (70–79%) D (55–69%) F (below 55%)

Dates to drop the course **online:** Without a “W”, Sunday, September 13, 2015; With a “W”, Sunday, November 22, 2015.

ACADEMIC and ADMINISTRATIVE HOLIDAYS affecting this class:

Thanksgiving Holiday will be observed on Thursday-Saturday, November 26-28, 2015.

ACCOMODATIONS AND OTHER INFORMATION

Attendance Policy: Students are expected to attend every class meeting, arrive on time, and stay throughout the class period. Students may be dropped from class for excessive tardiness and absenteeism, failure to attend/appear on the first day of class or entire first week of class.

Academic Dishonesty Policy: As described in the LACCD Student Code of Conduct (Board Rule 9803.28), “Violations of academic integrity of any type by a student provides grounds for disciplinary action by the instructor of college. Violations of Academic Integrity include, but are not limited to, the following actions: cheating on an exam, plagiarism, working together on an assignment, paper or project when the instructor has specifically stated students should not do so, submitting the same term paper to more than one instructor, or allowing another individual to assume one’s identity for the purpose of enhancing one’s grade.” For more information on the Standards of Student Conduct, refer to the college catalog available in hardcopy and online at www.lattc.edu. Cell phones are not allowed during an exam or quiz.

A NOTE ON CHEATING: Cheating is any behavior that violates academic integrity and honesty. Cheating is not condoned in any form. If a student is caught cheating, the penalty is a zero for the assignment and an “F” in the course. No exceptions!!!

Disability Support Services (DSS) Accommodation: “Students with disabilities who need any assistance or accommodations should contact the instructor”. The DSPS office is available to assist with accommodating a disabled student at x3733 and is located in (Mariposa Hall) MA 100.

Disclaimer: Syllabus/Lab Schedule subject to change.

Learning Skills Center: “To further your success, reinforce concepts, and achieve the stated learning objectives for this course, I refer you to Learning Skills Center for learning assistance services. You will be automatically enrolled in Supervised Tutoring, a free noncredit course that does not appear on your transcripts. Services are located in (Mariposa Hall) MA 109.

Topics and Readings in *Introduction to Biomanufacturing* by NBC2

Week	Dates (Sat)	Chapter Topic	Homework
1	9/5	Chap 1 – Overview/Intro	All problems in <u>Check Your Knowledge</u> section at end of each Chapter.
2	9/12	Chap 2 – Facilities	
3	Sun, Sept 13	Last day to drop classes Online Without a “W”	
3	9/19	Chap 3 – Metrology	
4	Sept 26	Exam 1 (100 pts): Chapters 1 – 3 Chap 5 – Environmental Health and Safety	
5	10/3	Chap 5 – Environmental Health and Safety Chap 6 – Operational Excellence	
6	10/10	Chap 6 – Operational Excellence Chap 8 – Microbiological Control (Systems and Monitoring)	
7	10/17	Chap 8 – Microbiological Control (Systems and Monitoring)	
8	Oct 24	Exam 2 (100 pts): Chapters 5, 6, & 8 Biological Chemistry	
9	10/31	Biological Chemistry	
10	11/7	Chap 10 – Upstream Processing	
11	11/14	Chap 10 – Upstream Processing	
12	Nov 21	Exam 3 (100 pts): Chapter 10 and Biological Chemistry Chap 10 – Upstream Processing	
13	Sun, Nov 22	Last Day to drop classes Online With a “W”	
13	11/28 – No Class	Holiday – Thanksgiving Day	
14	12/5	Chap 11 – Downstream Processing	
15	12/12	Chap 11 – Downstream Processing	
16	Sat, 12/19	7:30 am – 9:30 am, Final Examination, Site TBD (300 pts)	

Student Learning Objectives: This Syllabus lists all the information students are expected to know by the end of the course.

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Week	Dates (Sat)	Experiment Topic
1	9/5	Lab 1: Lab Safety and Good Documentation Practices
2	9/12	Lab 2: Laboratory Measurements
3	Sun, Sept 13	Last day to drop classes Online Without a "W"
3	9/19	Lab 3: Solutions, Dilutions, Buffers, and pH
4	9/26	Lab 4: Metrology: Pipetting
5	10/3	Lab 5: Standardization and Operation of pH Meter
6	10/10	Lab 6: Spectrophotometry
7	10/17	Lab 7: Media Prep, Cell Culture, and Aseptic Technique
8	10/24	Lab 8: Bacterial Transformation / Microbial Fermentation
9	10/31	Lab 9: Bioreactor
10	11/7	Lab 10: Bioreactor (continued) and Centrifugation
11	11/14	Lab 11: Filtration
12	11/21	Lab 12: Chromatography
13	Sun, Nov 22	Last Day to drop classes Online With a "W"
13	11/28 – No Class	Holiday – Thanksgiving Day
14	12/5	Lab 13: Chromatography (continued) and Gel Electrophoresis
15	12/11	Lab 14: Validation of Protein Recovery and Purification, Calculation of Yield, Laboratory Cleanup and Checkout

LAB GRADING: The sum of all Lab Reports and Lab Participation will account for 30% of the final grade in the course.

Note: Lab Coats and Safety Goggles are Required! You will not be allowed to enter or participate in the laboratory without them.

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