Biotechnology & Molecular Bioengineering

Instructor: Dr. Justin Chartron

Meeting times & locations: LEC MWF 8:10am - 9:00am, Sproul Hall 1102

DIS21 T 5:10 - 6:00pm, Boyce 1471 DIS22 F 2:10 - 3:00pm, Spieth 1307

Office Hours: Dr. Chartron: WR 2:00 – 3:00pm MSE 239

(or by appointment)

TA: Brian Lupish: T 1:00 – 2:00 pm MSE 217

Contact Information: Dr. Chartron: <u>ichartron@engr.ucr.edu</u>

Brian: <u>blupi001@ucr.edu</u>

Prerequisites: BIEN101

Course Description: Provides an overview of biochemical processes in cells and their use in developing new products and processes. Presents cellular processes such as metabolism, protein synthesis, enzyme behavior, and cell signaling and control from an engineering viewpoint of modeling and control.

Course Objectives:

- Familiarity with current approaches to develop and manufacture biotechnologies
- Proficiency in reading the primary scientific literature
- Awareness of ethical issues raised by biotechnology

Grading:

Component	Percentage
Assignments	4 x 10%
Midterm Exam	20%
Final Exam	40%

Reading and Assignments: Readings (review and research articles) will be posted on iLearn. Assignments are due on Fridays at 6:00 pm and can be submitted on iLearn or dropped off at Dr. Chartron's office (MSE 239).

Late assignments will be accepted with a 10% penalty for every day beyond the due date.

Exams: Only information provided to you in or during the exam is permitted. Exams are taken individually.

Student Responsibilities:

Participation: Students are encouraged to attend lectures and discussion and to actively participate by asking questions, suggesting solutions, and helping their fellow students learn. Attendance will not be taken. However, please respect your fellow students by being on time.

Clicker questions will be used test understanding during lecture, but participation is not mandatory.

Collaboration & Academic Honesty: Students are encouraged to discuss and work on problems together, but must submit their own, original solutions and explanations for any assignments and exams.

Plagiarism and other academic dishonestly will *not* be tolerated.

COURSE SCHEDULE

Week	Lecture Dates	Weekly Topics	Assignments + Exams
1	1/8 1/10 1/12	Course overview Recombinant DNA technology	
2	1/17 1/19	No class on 1/15 Chemical DNA synthesis & sequencing Manipulation of gene expression	
3	1/22 1/24 1/26	Protein production & purification Mutagenesis & protein engineering	Homework 1 due 1/26
4	1/29 1/31 2/2	Protein therapeutics Commercial product engineering	
5	2/5 2/7 2/9	Vaccine development Midterm Review	Homework 2 due 2/9
6	2/12 2/14 2/16	Midterm Examination on 2/12 Nucleic acid therapies & DNA technology Molecular diagnostics	Midterm Exam on 2/12
7	2/21 2/23	No class on 2/19 Bioremediation and biomass utilization Genetic engineering of plants	
8	2/26 2/28 3/2	The human genome Gene therapy	Homework 3 due 3/2
9	3/5 3/7 3/9	Personalized medicine CAR-T	
10	3/12 3/14 3/16	Ethical issues in biotechnology Final Review	Homework 4 due 3/16
11	3/21	Final Examination 7:00pm - 10:00pm Wednesday, March 21	FINAL EXAM