



## **MIC 292 - From Discovery to Product: An Introduction to Biotechnology at the Industrial Level**

Section 002 - CRN 33475 (1 unit) Winter Quarter 2022

Mondays, 12:10-1:00pm, 1022 Green Hall

### **Instructors of Record:**

Dr. Denneal Jamison-McClung  
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### **Course Summary**

MIC292 provides a unique opportunity for UC Davis students and community members to gain insights into bioindustrial manufacturing and applications in human/animal health and nutrition, agriculture, and natural resource preservation. Lectures will include presentations by scientists working in biotech companies focused on producing novel industrial enzymes, fibers and textiles, foods, biofuels, and other widely used materials. Promoting environmental sustainability is a key driver for innovation in this technology space and we'll touch on societal impacts, as well as learning more about the upstream and downstream platform technologies and approaches that support industrial R&D and commercial deployment goals.

### **Course Format and Topics**

We will be Zooming through January and meeting in-person in 1022 Green Hall on Mondays at noon through February and March for most class meetings. For in-person meetings, the lecture room has Zoom capability and we will broadcast and record those seminars, as well. After January, we may have guest lecturers who opt to Zoom from a distance for their presentations – on those days, we will not meet in person. Class participants will be notified of Zoom days via Canvas announcement (also, see tentative schedule at the end of this document for tentative, initial scheduling plans for in-person vs. Zoom, based on current guest speaker availability).

The format for the seminar series will consist of an introductory lecture by the course instructors and 7 guest lectures by industry research scientists. A variety of topics related to bioindustrial manufacturing will be covered and may include, though not limited to, the following:

- Identifying, characterizing and engineering production strains/cell types for bioprocessing
  - Common biomanufacturing cell types / cell banking
  - Metabolic pathway engineering
  - Microcarriers / co-cultivation of cell types
- Bioprocess development and optimization
  - Cell growth / optimization
  - Media components and costs
  - Bioreactor types and applications
- Downstream product purification and formulation
  - Biomolecule separation and purification
  - Bioprinting / development of complex 3D products
  - Storage, stability and packaging
- Scale-up and Commercialization
  - Automation of upstream and downstream processes/data management
  - Regulatory affairs
  - Technoeconomic and life cycle analyses
  - Product development/marketing

## Grading / Expectations for Participation and Attendance

### *Course Attendance (80 pts)*

Course attendance and participation during in-class discussions will be expected. Attendance at each of 8 class meetings (10 pts per meeting) will earn 80pts. Students should contact the course instructors if they have missed a lecture to receive the Zoom recording link in order to inform the final writing assignment, but the missing points will not be restored.

### *Final Writing Assignment (100 pts)*

Students should take notes during each guest lecture and use these to inform a ~3-4 page final writing assignment that:

1. Summarizes the presented information on company mission, R&D/bioprocessing approaches and products in development or on the market. (*Note: There may be more than one guest lecturer per company and information on related lectures may be included in the same section or paragraph, if needed.*)
2. Highlights the potential for environmental, economic, political and/or societal impacts of the presented technologies.

The writing assignment will be due by the scheduled final exam time via Canvas upload – 12:30pm on Wednesday, March 16, 2022. Grading will be Pass/No Pass (Grads: S/U or NS; Undergrads: P/NP). Undergraduates should check with their academic advisors as to the suitability of this course for upper division credit.

As with all campus courses, we expect students to abide by the UC Davis Code of Academic Conduct, which can be found at: <http://sja.ucdavis.edu/files/cac.pdf>.

The course is aimed at graduate students in all areas of biology, engineering and agriculture and is an [approved seminar elective for the Designated Emphasis in Biotechnology \(DEB\) graduate program](#), substituting for one quarter of the Current Progress in Biotechnology (DEB294/ECH294) seminar series.

## Winter Quarter 2022 MIC292 Course Schedule

Date	Company/Topic	Speaker
3-Jan-22	Course Overview and Introduction to Industrial Biomanufacturing	Denneal Jamison-McClung
		Karen McDonald
10-Jan-22	Bioentrepreneur: From Lab Bench to Boardroom to Lab Bench	Ray Rodriguez
17-Jan-22	<i>MLK, Jr. Holiday</i>	
24-Jan-22	Perfect Day	Tim Geistlinger
31-Jan-22	Better Meat Company	Moran Farhi
7-Feb-22	Huue	Krissy Mahan (DEB Alum)
14-Feb-22	California Cultured	Steve Stearns
21-Feb-22	<i>Presidents' Day Holiday</i>	
28-Feb-22	TurtleTree	Vanessa Castagna and Emma Skoog
7-Mar-22	Mission Barns	George Engelmayr
	Finals Week – March 14 – 18, 2022	

**Final writing assignments due via Canvas upload by 12:30pm on March 16, 2022**