

**Course Name: BioPharm Production Processes****Term Year: Summer 2025****Biopharmaceutical Production Processes** (AKA "Bioreactors" or "BPP")

Course ID: BIOT 775/875

Dates: May 19 - Aug 8

Instructor: Raymond Miller

Raymond.Miller@unh.edu

O: 603-641-4337

**Course Overview**

We will investigate the ideas, skills, and applications of the biopharmaceutical development process of a recombinant protein therapeutic in a mammalian host vector. Concepts will cover the entire production process from scale-up to bioreactor cultures to downstream processing.

CAR-T will not be covered this summer and instead we will briefly work with mesenchymal stem cells.

**Textbook (required)**

None required/recommended.

**Course Description**

"This course will provide students with an overview of biopharmaceutical production processes through lectures. The course begins by introducing students to the proteins and biotechnology companies and to cGMP. During lab, students will use mammalian cells to produce and monoclonal antibody, by developing manufacturing SOPs, including upstream and downstream processing, and quality control and assurance. Students will also gain experience with T-cell culture as part of the CAR-T technology utilized in personal medicine."

**Learning Objectives**

Upon completion of this course students will:

- Understand bioreactor systems in theoretical and applied concepts
- Demonstrate technical aptitude in advanced laboratory cell culture
- Strengthen cognitive critical analysis and decision-making in the scientific process

**Course Schedule**

Please see the course Canvas page for the most up-to-date calendar throughout the semester. Any changes will also be announced via Canvas and in class. The start date will be May 19 and the end date will be Aug 8. Classes are on M-W-F, lectures are 11a-1p and labs are 9a-12pp.

Some weeks we will have an alternate schedule:

- No Class (recorded lecture), Monday May 26
- Lab 9-12 instead of lecture, Monday July 21
- Class Break, June 22 - July 5

# COURSE SYLLABUS

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## Grades

*See below for an outline of assignments and points*

Item	% or points	Requirements
Engagement	100	A portion of your grade is dependent on your engagement with the class material and lab activities.
Post-Lab Quizzes	200	Ten (20 pt) pre-lab quizzes due every Monday before 10am.
Lab Presentations	100	Two (50 pt) skills application presentations in lab. See more details below.
Paper Discussions	200	Ten (20 pt) paper discussions due every Saturday at 11:59p.
*Lecture	50 - UG	A comprehensive literature review on one concept discussed during lecture. Topic is open choice therein.
Topic Paper	150 - GR	
Mid-Semester Quiz	100	July 21 - cumulative assessment of lab and lecture. Take home and open note.
Final Exam	100	Aug 16 - cumulative assessment of lab and lecture. Take home and open note.
<b>Total</b>	<b>850 / 900</b>	

\* Lecture topic paper weight based on registration as undergrad or graduate section

## Assignment Details

### Post-Labs

**200 pt**

20-point, with 5-10 multiple choice and short response questions based week's lab protocols.

### Lab Presentations

**100 pt**

50-point, skills application presentations are independent lab presentations on your results to-date and plans or ideas for the project's next steps. These should be a research lab style in-person presentation. We will develop skills and data for these together throughout lab.

### Paper Discussion

**200 pt**

20-point, paper discussions will be a collaborative discussion on Canvas to analyze key literature to expand conceptual knowledge about lecture and lab practices.

### Lecture Topic Paper

**50 pt - UG / 150 pt - GR**

A comprehensive literature review style scholarly paper on one concept discussed during lecture. Topic is open choice to any lecture concept. We will review topic ideas during the first few weeks of class. Number of points is based on registration as undergrad or graduate.

**Course Name: BioPharm Production Processes****Term Year: Summer 2025****Mid-Semester Quiz****100 pt**

Due June 29, this is a cumulative assessment of lab and lecture topics, procedures, etc. Take home and open note. \*See *Academic honor and Plagiarism*

**Final Exam****100 pt**

Due Aug 10, this is a cumulative assessment of lab and lecture topics, procedures, etc. Take home and open note. \*See *Academic honor and Plagiarism*

**Policy on Attendance, Late Submissions**

- Please arrive on time and expect to attend the entire duration of the class. Missing two or more classes will result in a fail, as well as missing more than 15% of the class combined. You must dress appropriately for BSL-2 lab activities. Failure to arrive prepared for lab will result in missing that lab.

If you are dealing with an unexpected, extenuating circumstance that will keep you out of class or affect your performance for more than a day or two, reach out to Lisa Enright, Assistant Dean of Student Success, at [lisa.enright@unh.edu](mailto:lisa.enright@unh.edu) to request a letter be sent to all your faculty.

- Unapproved late submissions will graded as zero points. Please reach out *prior* to due date submission times if you believe you will not make the assignment deadline.

**Class Participation**

Participation in class is qualified as actively engaged with me, your instructor and your classmates as fellow colleagues. Professionalism is

**Student to Instructor Communication Expectations***My Schedule*

I am on campus 9-5 every day M-F. You can drop in for a quick chat, but I may get busy with other obligations. The best way to meet with me outside of office hours is to schedule some time. I will check Canvas at least once a day and any messages will automatically notify me. On Saturday, I may not login at a regular time. If you post late on Friday or anytime Saturday, I might not respond until Sunday morning. Sunday, I have blocked out the afternoon for course assistance.

Office Hours: Mondays 1-2, Thursdays 2-4

*How to Reach Me*

Please use email as the main form of communication in this course. It's the fastest way to get in touch with me and I will usually reply to emails within a few minutes, whereas Canvas messages may take up to 24 hours. My contact information is as follows:

Raymond.Miller@unh.edu      Office: 603-641-4337

**Technical Requirements and Technical Support**

See website listings for current recommendations and requirements related to this course - <http://unh.edu/eunh/technical-requirements> Technical assistance related to Blackboard is available at <http://unh.edu/eunh/student-resources>

**University Disability Accommodations**

*Student Accessibility Services (SAS) – Manchester*

According to the Americans with Disabilities Act (as amended, 2008), each student with a disability has the right to request services from UNH to accommodate his/her/their disability. If you are a student with a documented disability or believe you may have a disability that requires accommodations, please contact Student Accessibility Services (SAS) located on the Manchester campus in the Student Services Suite (Office 405A).

Accommodation letters are created by SAS with the student. Please follow-up with your instructor as soon as possible to ensure timely implementation of the identified accommodations in the letter. Faculty have an obligation to respond once they receive official notice of accommodations from SAS but are under no obligation to provide retroactive accommodations.

For more information refer to [www.unh.edu/sas](http://www.unh.edu/sas) or contact SAS at 603.862.2607, 711 (Relay NH) or [sas.office@unh.edu](mailto:sas.office@unh.edu).

**Academic Honesty and Plagiarism**

Students are required to abide by the UNH Academic Honesty policy located in the [Student Rights, Rules, and Responsibilities Handbook](#).

<http://libraryguides.unh.edu/unhmcitingsources>  
<http://www.library.unh.edu/reference/citation.shtml>

**Artificial Intelligence:**

Unless otherwise specified, the use of Automated Writing Tools, including chatGPT and similar artificial intelligence (AI) tools, is strictly prohibited in this course, even when properly attributed. The use of automated writing tools is considered plagiarism (as defined by UNH's Academic Integrity Policy) and will be handled in accordance with existing policy.  
<https://catalog.unh.edu/srrr/university-policies-regulations/academic-honesty/>

**PLAGIARISM**

Use or submission of intellectual property, ideas, evidence produced by another person, including computer generated text or work outsourced to third-parties, in whole or in part as one's own in any academic assessment without providing proper citation or attribution. In some cases, reusing one's own previous work without acknowledging or citing the original work can constitute self-plagiarism.

**Course Name: BioPharm Production Processes****Term Year: Summer 2025****Credit Hour Policy**

This syllabus reflects the federal definition of a credit hour, which entails a minimum 3 hours of engaged time per week per credit over a 15-week semester. Examples of engaged time include class time, assignments, examinations, laboratories, participation in course-related experiences (attending a talk or performance, speakers and events, fieldwork, etc.), conferences, and office hours. Student work reflects intended learning outcomes and is verified through evidence of student achievement. For more information, please see: Pp111\_Policy\_On\_Credits-And-Degrees.pdf (neche.org)

**Library:** The UNH Manchester librarians are available to assist you with your research. You can contact a librarian by calling 603-641-4173 or by emailing [unhm.library@unh.edu](mailto:unhm.library@unh.edu).

The following online resources provide information about library resources and services:

**UNH Manchester Library webpage:** <https://cps.unh.edu/library>

**Online Research Guides:** <https://libraryguides.unh.edu/index.php?b=s>

**Access Library Resources Remotely:**

<https://libraryguides.unh.edu/remoteaccess>

**Reserve a study room for Zoom classes:**

<https://libraryguides.unh.edu/remoteaccess/studyrooms>

**Center for Academic Enrichment:**

The Center for Academic Enrichment (CAE) professionals and peers are available to support all UNH Manchester students in maximizing their learning potential through individual in-person and online tutoring, in-class workshops, and study groups in math, writing, course content, study skills, time management, and personal statements. All students registered for UNH Manchester courses are entitled to one hour of individual tutoring, per course, per week. Appointments are available at <https://caetutor.unh.edu>; for more information, contact the CAE at (603) 641-4113, or [unhm.cae@unh.edu](mailto:unhm.cae@unh.edu).

**Confidentiality and Mandatory Reporting of Sexual Violence or Harassment – Manchester**

The University of New Hampshire at Manchester and its community are committed to assuring a safe and productive educational environment for all students. Title IX makes it clear that violence, harassment, and discrimination based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, and ability.

If you or someone you know has experienced sexual or relationship violence, and/or stalking and harassment, you can find the appropriate resources below:

Reporting On Campus:

- Title IX Deputy Intake Coordinator: Lisa Enright 603-641-4336. Lisa's office is located on the fourth floor in Room 439.
- UNH Manchester Security: 603-641-4124 or located in the second floor foyer

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Reporting Off Campus:

- Manchester Police Department - 603-668-8711, 405 Valley St. Manchester, NH
- or your local police department

For emergencies dial 911.

Confidential Support Resources:

- YWCA, NH – 603-668-2299(24hour), 72 Concord St. Manchester, NH
- Sexual Harassment and Rape Prevention Program (SHARPP): 603-862- 7233(24hour), 8 Ballard Street, Wolff House, Durham NH 03824
- The Mental Health Center of Greater Manchester: See contact information and hours above
- 24 Hour NH Sexual Violence Hotline: 1-800-277-5570
- 24 Hour NH Domestic Violence Hotline: 1-866-644-3574

## **Emotional or mental health distress – *Manchester***

In partnership with The Mental Health Center of Greater Manchester, UNH Manchester offers consultation visits on a walk-in basis and through telehealth appointments. Services include:

- Free confidential screening & consultation with a licensed mental health therapist.
- Referrals to mental health or substance misuse treatment. And assistance in understanding how to afford additional treatment (with or without insurance!) or find free services.

**You may email: [unhm.wellness@unh.edu](mailto:unhm.wellness@unh.edu) to make an appointment to meet with a counselor by clicking [here](#) or by using the QR codes below.**

For in person appointments please scan this code



For remote appointments please scan this code



If you would like to connect to counseling services directly, you may do so by contacting The Greater Manchester Mental Health Center at (603) 668 - 4111.

The National Suicide Prevention Lifeline provides 24/7, free and confidential support via phone or chat for people in distress, resources for you or your loved ones, and best practices for professionals. Call (800) 273-TALK (8255).

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**Food Pantry:** The UNH Manchester Food Pantry, located in room 437 is open Monday through Friday from 8:00am- 9:30pm. Any UNH Manchester community member can take what they need. If you have any questions please email UNHM.Foodpantry@unh.edu

**Basic Needs Support:** Food, Housing, Financial. <https://www.unh.edu/dean-of-students/getting-help/housing-food-financial-basic-needs-support>

**Sexual Harassment and Rape Prevention Program (SHARPP):** Provides free and confidential advocacy and direct services to survivors. UNH Manchester's SHARPP Office Hours during Fall & Spring Semesters are Mondays 9am-4pm in Room 471. Zoom Appointment Availability year-round is Mon-Fri 9am-4pm

24/7 Crisis Line: 603-862-SAFE (7233)

Main Office: 603-862-3494

<https://www.unh.edu/sharpp>/<https://www.unh.edu/sharpp>.)

UNH Manchester students can also contact the YWCA of New Hampshire – 603-668-2299 (24hour), 72 Concord St. Manchester, NH, for crisis or emergency services.

**QPR** is a training program in mental health awareness and suicide prevention training offered by trained facilitators and members of the UNH Manchester community. Please contact Lisa Enright at [lisa.enright@unh.edu](mailto:lisa.enright@unh.edu) should your department or program want to schedule a training session.

Note: This syllabus is subject to change. Students will be promptly notified of any changes.