FA25 SBEL Syllabus (Version 1)

Course Number and Title:

BIOT 870 - Stem Cell and Biomaterials Engineering Lab, Credit Hours: 3.0

BIOT 770 - UG Course Version, Credit Hours: 4.0

Course Details:

Spring 2025 (U. of New Hampshire, Manchester, NH)

380 (Lecture; MW 2:10-3:30 pm)

650EC (Lab; MW 3:40-6:00 pm + Friday Cell Maintenance)

Location: 88 Commercial St. Building

Professor (Instructor):

Won Hyuk Suh, Ph.D.

Office: 622, Phone: 603-641-4145

E-mail: WonHyuk.Suh@unh.edu

Office Hours: E-mail to schedule

Zoom PMI 267 908 3222

Lab Teaching Assistants:

- **Main TA:** Trinity Minard
- **Secondary TA:** Andres Monsalve

Course Materials and Textbook:

Journal articles and book chapters (Please check on Canvas for more details)

Plus custom-, instructor-made handouts

Course information: Introduction to stem cells and how biomaterials are utilized in their applications involving biotechnology and biomedical engineering. Lab topics such as aseptic technique, stem cell cultures, biomaterials engineering, bioprinting, biocompatibility and bioactivity analyses will be covered. Lectures will focus on the current literature while the lab portion involves inquiry-based projects that will investigate how biomaterials and molecules modulate stem cell proliferation and differentiation.

Note: *Friday lab times (any available 2-to 3-hour time block between 9 am and 5 pm) will mainly be utilized for cell maintenance purposes. If the weekly third lab period (i.e., Friday) is not possible, a student can coordinate with the instructor and come up with an alternative schedule. For more information, please contact the instructor.*

Learning goals:

At the end of this course, students will…

(1) Know techniques for basic and advanced cell cultures involving mammalian cells including adult and/or pluripotent stem cells.

(2) Know the synthesis, fabrication, and characterization methodologies used for biomaterials.

(3) Know how to communicate scientific findings with proper literature research conducted.

(4) Know how to use both engineering (methodology) and scientific (hypothesis) approaches to problem-solving thereby learning to distinguish between the two approaches; Know how to design an experiment to test a devised hypothesis within the context of biotechnology.

(5) Know how to interpret data from an experiment and put data into context.

Student Learning Outcome:

(A) An ability to conduct experiments involving cells, molecules, biomaterials and analyze experimental results via data analysis methodologies aided by computational methods.

(B) An ability to interpret data involving cells and biomaterials and put data into context.

(C) An ability to create a well-organized, logical, reference-based document that is visually appealing, uses appropriate words and grammatical structure, and free of ethical issues (i.e., plagiarism).

UNH Academic Calendar: link (https://catalog.unh.edu/undergraduate/academic-calendar/)

Please check the academic calendar above.

Lab Weekly Schedule:

Week Lab (Lecture) Contents

01 Basic Training, Part 1 (Introduction to Molecules, Chemicals, & Biomaterials)
02 Basic Training, Part 2 (Cytotoxicity + Data Analysis + MicroProject Proposal Writing, Part 1)
03 Basic Training, Part 3 (Cytotoxicity + Data Analysis + MicroProject Proposal Writing, Part 2)
04 Transition Week (Cytotoxicity + Data Analysis + MicroProject Proposal Writing, Part 3)
05 MicroProjects Start (Cytotoxicity + Data Analysis + MicroProject Proposal Writing, Part 4)
06 MicroProjects Continue (Stem Cell Culture)
07 MicroProjects Continue (Stem Cell Culture) + **Research Conference Registration by TBA.**
08 **Mid-Term Exam 10/08/2025, Wednesday** + **Submit Basic Training Lab Report (10/12/25, Sunday)**
09 MicroProjects Continue (Literature Survey Preview)
10 MicroProjects Continue (Student Paper Presentations 1 + 2)
11 MicroProjects Continue (Student Paper Presentations 3 + 4)
12 MicroProjects Continue (Student Paper Presentations 5 + 6; **Submit Poster by TBA**)
13 MicroProjects Continue (Literature Survey Review)
14 MicroProjects Continue
15 MicroProjects Continue (**Mid-Term Exam 12/03/2025 + Oral Presentation Preparation**)
16 MicroProjects End (Oral Presentation Preparation); Last day of class, 12/08/2025 (Monday)
17 **Final Presentation Exam (Mon., 12/15/2025)**
MicroProject Related Submissions (Wed., 12/17/2025)

Reference and Discussion Papers Info: link (https://mycourses.unh.edu/courses/139827/pages/sp25-and-fa25-sbel-key-reference-papers-info) . Grading Explanations (% Values are out of 100 %):

- **Cell Maintenance Friday Details**: Cell Maintenance Fridays are crucial for maintaining healthy cells. Should any cells perish or differentiate due to poor maintenance practices by any team, the responsible team members may face point deductions from their final grades.
- **Attendance and Participation** (**-2 %/missed class**): Lecture/Lab attendance will be monitored throughout the course. One unexcused class absence will account for -2 % deduction from your final score after it is finalized to a 100 % scale. Please effectively communicate any situations that will affect your attendance and participation.
- **Lab/Lecture Assignments** (**47.5 %**): Specific lab- and lecture-related assignments (including lab reports) will be provided via Canvas. These assignments will serve as either pre-studying materials or lab/lecture reviewing materials. They will aid in your exam and final report preparations throughout the course.
  - Lecture: Paper Discussions and/or Quizzes (**12.5 %**)
  - Lab: Saturday E-Logs (**25 %**), Regular Lab Report (**10 %, due 10/12/2025, Sunday**).
- **Mid-Term Exam** (**12.5 %**): ***Two*** mid-term exam (written exam) is planned. Any updates or changes will be communicated via e-mail, course website, and/or during instruction times. Currently scheduled for **10/08/2025** and **12/03/2025**.
- **Research MicroProject** (**27.5 %**) = Research Conference Presentation Related (**12.5 %**) + Research Project Lab Report (**15 %** overall): Research conference poster to be completed and submitted by TBA. The FINAL versions will be completed and submitted by the instructor. Research project related labs will involve student projects designed to hone their skills in stem cell and biomaterials engineering and data analysis. Detailed and associated announcements will be communicated via e-mail, course website, and/or during instruction times.
  - **Lecture**: Poster Presentation Related Assignments + Symposium Presentation (**12.5 %**)
  - **Lab**: Research Project Lab Report (**15 %**).
- **Final Exam** (**12.5 %**): One final exam is planned. This semester it will be an oral presentation of each team's chosen research project. Any updates or changes will be communicated via e-mail, course website, and/or during instruction times. Currently scheduled for **12/15/2025 (Monday)**.
- **All final MicroProject Submissions are due by 12/17/2025 (Wednesday).**

Grading Breakdown Table:

	Canvas Inputs		Actual % Scores (Out of 100 %)	
Category	Lecture (**M1**)	Lab (**LM1 or LM2**)	Lecture	Lab
Attendance	-4 %/missed class/lab	Loss of points/missed lab	-2 %/missed class	Loss of points/missed lab
Assignments	**25 %** (Proposal + literature + Q&A)	**70 %** (E-Logs 50 % + Files 20 %)	**12.5 %**	**35 %** (E-Logs 25 % + Report 10 %)
Mid-Term Exam	**25 %** (1st: 10 %, 2nd: 15 %)	x	**12.5 %**	x
Poster Presentation	**25 %** (Drafts + final ver.)	x	**12.5 %**	x
Oral Presentation	**25 % (Final Exam)**	x	**12.5 % (Final Exam)**	x
MicroProject Paper	x	**30 % (Final Report)**	x	**15 % (Final Report)**
Extra Credit	TBD			
Total	100 %	100 %	**50 %**	**50 %**

Additional Grading Breakdown Details (Alternative View):

- Assignments will be released via Canvas.
- Attendance: See chart above.
- Lecture Assignments (12.5 %): See chart above. Paper Discussions and/or Quizzes: 12.5 %.
- Lab Assignments (35 %): See chart above. E-Logs: 25 %. Regular Lab Report: 10 %.
- Mid-Term Exam (12.5 %): See chart above. Mid-Term Exam: 12.5 %.
- Presentations (25 %): See chart above. Poster: 12.5 %. Final Exam: 12.5 %.
- Final Paper (15 %): See chart above. Final Paper: 15 %.

Additional MicroProject Related Assignment Details:

- **Course presentation and report templates/guidelines are here: poster | oral presentation | report .**
  The **final paper** should be no more than **15 pages** (including references). Formatting should be font size 11, Times New Roman font and single-spaced. Layout margins should be 1 inch exactly on all sides. Your paper should cite no more than 15 references (5-10 recommended). Additionally,
- the total number of figures and tables should*not* exceed 15 and their utilization will be counted in the page limits. All other formatting should follow the National Institutes of Health (NIH) PHS 398 guidelines, especially the references. The Final Lab Report must be submitted via Canvas and will be checked for plagiarism. Late submission past the deadline will result in reduced grade points. Refer to the 'Late Submission Policy' below. Additionally, any editorial errors (e.g., typos, formatting mishaps) will result in overall point deductions (-0.2% from 25 % total possible, per error). Make sure you perform spell/grammar and format checks.
  Additional Extra Credit (TBD): This will be announced separately later.
  Late Submission Policy: Late submission scores (for assignments; unless specified otherwise) will be deducted 10% for the first 24 hours. After
- that, the overall assignment score will be further deducted by 10 % (of the particular assignment's attempt score) per one day (24 hours). Everyone
- will have 10 days to submit late assignments for partial credit, basically. Below is the breakdown.

  -
  -

  - 1st 24 Hours late = (GRADED SCORE) x (1-0.1*1) = (GRADED SCORE) x **0.90**

- 2nd 24 Hours late (within two days late) = (GRADED SCORE) x (1-0.1*2) = (GRADED SCORE) x **0.80**
- 5th 24 Hours late (between 4-5 days late) = (GRADED SCORE) x (1-0.1*5) = (GRADED SCORE) x **0.50**
- 9th 24 Hours late = (GRADED SCORE) x (1-0.1*9) = (GRADED SCORE) x **0.10**
- Start of 10th 24 Hours late = (GRADED SCORE) x **0.00**

- **Graduate Student Specific Assignment:** TBA

Grading Scale:

A: 94-100	B+: 87-89	C+: 77-79	D+: 67-69	F: <60
A-: 90-93	B: 83-86	C: 73-76	D: 63-66	
	B-: 80-82	C-: 70-72	D-: 60-62	

Accommodations: The University is committed to providing students with documented disabilities equal access to all university programs and facilities. If you think you have a disability requiring accommodations, you must register with the Student Accessibility Services (SAS) office. The Student Accessibility Coordinator at UNHM is Jenessa Zurek. Please reach out to the SAS office via email at jenessa.zurek@unh.edu for registration information and disability related questions. Jenessa Zurek is available through phone and email Mondays and Wednesdays from 9 am to 2 pm.

For University policies on student responsibilities and academic honesty please see:
Student Rights, Rules and Responsibilities Academic Policies (https://www.unh.edu/student-life/student-rights-rules-responsibilities), 04-Attendance and Class Requirements. Please see Resource Hub PDF section 10.0 (or web page https://www.unh.edu/provost/guidance-fall-2020-instruction) for guidance.

Academic Honesty Policy: Honesty is a core value at the University of New Hampshire. The members of its academic community both require and expect one another to conduct themselves with integrity. This means that each member will adhere to the principles and rules of the University and pursue academic work in a straightforward and truthful manner, free from deception or fraud. For more information please see: **https://catalog.unh.edu/undergraduate/academic-policies-procedures/academic-integrity/** & **https://catalog.unh.edu/graduate/academic-regulations-degree-requirements/academic-integrity/**.

AI policy (CPS@UNH MS Biotech Program):

AI/LLM (ChatGPT, Gemini, etc.) use is allowed for preliminary research or brainstorming within the Program. However, it is important to note that academic citation and source generation by AI tools is particularly problematic given evidence that these tools often invent citations even when they claim they are not doing so.

We highly value independent critical thinking and problem-solving skills and thus AI/LLM use is not allowed within the Program to generate answers or complete assignments. All use of AI/LLMs must be disclosed, including grammar polishing. In that case, the original unpolished version of the assignment must also be submitted along with the final version. Use of AI without disclosure is considered plagiarism.

Academic Alerts: The University is invested in student academic success. If a faculty member is concerned about your academic behavior or performance, they may submit an academic alert. Academic alerts are not punitive. The goal is to provide you with support and resources to support your success. They act as an important check-in point and, if you receive an academic alert, you will receive an email to your UNH email address. It is strongly recommended that you meet with a professional advisor and connect with your instructor to discuss the reason for the alert.

Note: For up-to-date syllabus information, please log on to the Canvas course website.

Revision Details:

- Week 01: Syllabus released and schedule updated (08/27/2025)