BIOE 202: Cell and Tissue Engineering Lab

Instructor
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DCL 3103

Teaching Assistants
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Laboratory Assistants
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Course Website
https://courses.engr.illinois.edu/bioe202/

Description
Principles of cell biology inherent in tissue engineering design. Lab experience in safely and skillfully manipulating multiple cell types and performing various quantitative analyses on products produced by cells that have differentiated.

Objectives
By the end of class, students will be able to...

- culture bacterial and mammalian cells and use them in experiments
- prepare figures
- write a technical report including abstract, introduction, methods, results, and discussion
- perform experimental techniques related to the biochemical analysis of molecules and cells
- interpret and analyze data obtained using biochemical analysis and computational techniques
- design an experimental procedure from given resources and limitations

Schedule and Location
All Sections
Lecture: Wednesdays 2:00-2:50pm in Siebel Center 1109

Section AB2
Main Lab: Tuesdays 3:00-6:50pm in DCL 3110
Return Lab: Fridays 2:00-3:50pm in DCL 3110

Section AB3
Main Lab: Tuesdays 11:00am-2:50pm in DCL 3110
Return Lab: Fridays 11:00am-12:50pm in DCL 3110

Section AB4
Main Lab: Mondays 11:00am-2:50pm in DCL 3110
Return Lab: Thursday 4:00-5:50pm in DCL 3110

Section AB5
Main Lab: Mondays 3:00-6:50pm in DCL 3110
Return Lab: 2:00-4:50pm in DCL 3110

Grading
Participation 5%
Quizzes 15%
Notebooks 5%
Reports 40%
Written Exam 20%
Lab Practical 15%

Participation: 5% of final grade

• Grade is based on involvement within the group during lab.
• Grade is based on arriving in proper attire. Students must wear pants and closed toed shoes for safety reasons. If improper attire is worn, the student will be removed from lab until returning wearing proper attire and thus reducing the participation grade.
• Attendance is required for all Main and Return Labs, unless otherwise stated ahead of time. A missed lab needs to be preapproved by the instructor. If a lab is missed without preapproval, a note from the doctor must be supplied or a reduction in participation, quiz, and report grades is to be expected.
• Cell phones must be silenced and put away during lecture and labs.

Quizzes: 15% of final grade

• Quizzes are given at the start of each Main Lab section to ensure that students are prepared and aware of important safety considerations.
• A missed quiz, due to absence or tardiness, needs to be preapproved by the instructor.
• No one is allowed to leave during a quiz.
• No notes or electronic devices are allowed during quizzes. Failure to comply will result in a failing grade on the quiz.
Assignments and Reports: 40% of final grade

- Students will prepare individual assignments and reports. While students are encouraged to discuss results within their lab groups, all assignments and reports must be the original work of the submitting student.
- Late assignments and reports will not be accepted.

Lab Practical: 15% of final grade

- The lab practical consists of successfully lifting, counting, and passaging cells in the presence of the TA or instructor.
- Grade is based on TA/instructor’s observation of technique, verbal questions from TA/instructor, and the presence healthy cells in a new dish.

Written Exam: 20% of final grade

- The written exam will be held during the Lecture section during the last week of class. There is no final exam for this course.
- No notes, texts, or electronic devices are allowed during the exam.

Notebooks: 5% of final grade

- Students will be asked to write the purpose of the experiment and the protocol in their own words ahead of the class period. This must be entered in the electronic notebook AND be printed and brought to class to receive credit.
- Appropriate notes must be taken during lab and entered into the electronic lab notebook before the end of lab. More details will be provided in class.

Required Materials
Notebook: We will be using LabArchives electronic notebooks. More details will be provided in class.

Course Policies
Lab quizzes
A major part of your grade is contingent on learning the techniques and protocols of this lab class to provide you marketable skills. As part of this guideline, we require your attendance, participation, and preparation. To test your preparation for this class a quiz will be administered at the beginning of the Main Lab. Read the lab handouts and lecture slides to prepare for the quiz. **A score of 50% or lower on two or more quizzes will result in a failing grade for the course.**

Assignments
Late assignments will not be accepted. Assignments must be uploaded to Compass by the deadline in order to receive credit. Paper copies of assignments will not be accepted unless otherwise stated.

Excused absences and accommodations
Absences from lab must be preapproved by the instructor a minimum of one week before the planned absence (surgery, conference, etc.). For unplanned absences please notify the instructor and teaching assistant as soon as you are able. Documentation for any absence is required. If possible, you may be asked to attend a different lab section or be asked to makeup the material at a separate time. Unexcused absences will result in a significant grade reduction. Accommodations (deadline extensions, conflict exams, etc.) will be granted according to university policy only and documentation will be required.

Statement on Professionalism
Students are expected to be professional at all times. Professional behavior includes, but is not limited to, arriving on time for meetings with the instructor, teaching assistants, and lab assistants, being polite and respectful to all course staff and fellow students both in verbal and electronic communications, being respectful of all lab equipment in the teaching and research labs, and not causing disruptions to class or other research labs. Failure to behave in a professional manner will result in a significant grade reduction up to 10% of the final grade, at the discretion of the instructor.

Statement on Academic Integrity
The University’s policy on academic integrity can be found in the Code of Policies and Regulations Applying to All Students under Article One, Part IV. The following policies support and reinforce that policy.
1. Science cannot exist without honesty. We expect all students, as scientists-in-training, to hold the highest standards of scientific and academic conduct. Any form of cheating on any graded work in this course is unacceptable, and will be dealt with as outlined below, and in accordance with the University-wide standards in the Code of Policies and Regulations Applying to All Students.
2. We require that all graded work be entirely your own, and that anything you write using the words of other writers be correctly attributed. Some specific points follow:
   For assignments and reports, the answers that you turn in for grading must be your own understanding of the material. While students are encouraged to discuss lab results with lab group members, assignments and reports must be the original work of the submitting student. Since we cannot monitor you as you complete your work, we have only the appearance of your work from which to judge. If the work that you submit closely resembles that of another student/team too closely, we may conclude that it was not your original work. Failure to adhere to these standards will result in a grade of zero for the entire assignment, for all persons involved.

On assignments, if you use another source to obtain the facts and/or opinions necessary to complete your assignment, you must credit the source (see next point below) and rephrase the information so that your assignment is entirely your own words. A good practice is to read the source until you have a thorough understanding of the material, and then put it away. Write your assignment as if
you are explaining the information you learned from reading the source to a classmate, member of your family, or to your teaching assistant. You may wish to look at the source again for clarification, but be certain that you do not use statements taken directly from the text in your assignment. Your entire assignment should be in your own words. Furthermore, paraphrasing does NOT mean replacing key words in a statement with synonyms or reordering sentence structure. For an example of proper paraphrasing of a statement, consult the University's Code of Policies and Regulations Applying to All Students. Entire paragraphs should not be paraphrased. Failure to adhere to these standards will result in zero credit for the entire assignment.

On assignments, if you use the ideas and/or opinions and/or figures from another author or source (including course materials), you must provide the appropriate citation. Details about how to cite various sources will be provided in the course Technical Writing Guidelines. Failure to adhere to these standards may result in zero credit for the entire assignment.

For quizzes and the written exam, any student cheating will receive a zero on the quiz or written exam, at minimum.

Students are expected to be aware of academic integrity policies and understand how these policies are applicable to their work. Ignorance of policies and how they apply is not an excuse. All infractions of academic integrity will be reported according to university policy. The instructor reserves the right to fail a student who does not uphold the academic integrity standards.

**Laboratory Safety**
Laboratory safety is a top priority. Students are responsible for knowing the lab rules and safety considerations for each lab. Take note of the location of:
- Fire extinguishers
- Emergency Shower
- Eyewash
- Personal Protective Equipment (lab coats, goggles, gloves, etc.)

Students must always wear closed toe shoes and pants to lab. Lab coats are required for all lab work. Lab handouts will specify when eye protection is required. Coats and Backpacks will be hung up or placed under the hooks behind the main double doors. Eating or drinking in the lab is prohibited. Failure to comply in lab safety rules will result in removal from lab and a significant grade reduction.

**Campus Emergency Policy**
In the event of a major campus emergency, course requirements, deadlines, and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. If an emergency should occur, check my.bioen and your Illinois email accounts to learn about
modifications to the course.

**Fire alarm:** Exit the building through the nearest exit (east side near University High School/N. Mathews Ave.). Meet the instructor in the area between the new ECE building and the Coordinated Science Laboratory and provide your name to the instructor before leaving.

**Tornado:** Exit the classroom and proceed quickly yet orderly to the basement of DCL. When in the basement, move away from the center stairs/open area; move north towards more isolated hallways.

**Civil unrest:** Options: **run** (get out of building if it is safe to do so), **hide** (turn off lights, silence cell phones, remain quiet, and stay out of site), or **fight** (if the first two options will not work, then do what is necessary to increase survival)

http://police.illinois.edu/emergencyplanning/general/instructors/

### Course Schedule

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<th>Week</th>
<th>Dates</th>
<th>Main Lab</th>
<th>Return Lab</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 19-22</td>
<td>No Lab</td>
<td>No Return Lab</td>
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<tr>
<td>2</td>
<td>Jan 25-29</td>
<td>Lab orientation, safety, pipetting, aseptic technique</td>
<td>Bacteria Growth</td>
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<td>3</td>
<td>Feb 1-Feb 5</td>
<td>Bacteria Transformation</td>
<td>Bacteria Transformation</td>
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<td>4</td>
<td>Feb 8-Feb 12</td>
<td>Bacteria Transformation</td>
<td>Mammalian Cell Culture primer</td>
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<td>5</td>
<td>Feb 15-19</td>
<td>Mammalian Cell Culture Week 1</td>
<td>Mammalian Cell Culture Week 1</td>
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<td>6</td>
<td>Feb 22-Feb 26</td>
<td>Mammalian Cell Culture Week 2</td>
<td>Mammalian Cell Culture Week 2</td>
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<td>7</td>
<td>Feb 29-Mar 4</td>
<td>Mammalian Cell Culture Week 3</td>
<td>Mammalian Cell Culture Week 3</td>
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<td>8</td>
<td>Mar 7-Mar 11</td>
<td>Fluorescence Microscopy</td>
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<td>9</td>
<td>Mar 14-Mar 18</td>
<td>Lab Practical</td>
<td>Lab Practical</td>
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<td>10</td>
<td>Mar 21-Mar 25</td>
<td>Spring Break</td>
<td>Spring Break</td>
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<td>11</td>
<td>Mar 28-Apr 1</td>
<td>Protein Quantification</td>
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<td>12</td>
<td>Apr 4-Apr 8</td>
<td>SDS-PAGE and Western Blot</td>
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<td>13</td>
<td>Apr 11-Apr 15</td>
<td>Project</td>
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<td>14</td>
<td>Apr 18-Apr 22</td>
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<td>15</td>
<td>Apr 25-29</td>
<td>Project</td>
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<td>16</td>
<td>May 2-4</td>
<td>Project/Written Exam</td>
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**Schedule is subject to change.**