

**LIFS/BIEN 5001 Responsible Conduct of Biomedical and Biotechnology Research  
Spring 2020 Syllabus**

**1. Instructors:**

*Course coordinator:* Prof. Angela WU (AW)

Phone: 3469-2577; Email: angelawu@ust.hk

Office: Room 5512 (L25/26), Division of Life Science/Department of Chemical and Biological Engineering

Prof. Danny Leung (DL)

Phone: 3469-2494; Email: dcyleung@ust.hk

Office: Room 5452 (L25/26), Division of Life Science

**2. Course description:**

Credit points: 3

Prerequisites: Knowledge of general biology, equivalent to introductory biology at the undergraduate level

Exclusions: Nil

Brief description:

This course will present common ethical issues encountered in biomedical research and biotechnology. Students will engage in active discussion to gain deeper understanding of each issue. The objective of this course is to raise awareness of the ethical issues surrounding biomedical/bioengineering research, and encourage critical and responsible consideration of research conduct. Topics covered will fall into three categories: 1) Research integrity, 2) Applied ethics in biological research and biotechnology, and 3) Contemporary ethical issues arising from emerging biotechnologies. Each class will consist of lectures wherein background information and specific examples relevant to the topic are presented by the instructor, as well as case studies presenting either a hypothetical scenario or real world events. Classes may also introduce in-class exercises and facilitated discussions. ***Due to the nature of the topics discussed, this course will use blended learning format - active student participation is absolutely required, and reading course materials prior to class is essential.*** During discussion of case studies, students are expected to identify opposing ethical perspectives, critically analyze each perspective, and suggest compromises and solutions when feasible, while using evidence to support their conclusions in a group discussion and/or team debate contexts.

**3. Course intended learning outcomes (CLOs):**

- i. Describe potential important ethical issues that biomedical researchers may face in their careers.
- ii. When presented with a case or specific scenario, be able to identify the explicit or potential ethical issues, arguments, and perspectives arising from the case or scenario.
- iii. Critically analyze and evaluate ethical issues revolving around contemporary biomedical/life science research in a contextual manner, and form and justify their own position on these ethical issues.
- iv. Recall and describe key principles, policies, and regulations relevant to the ethical and responsible conduct of research (e.g. Nuremberg Code).
- v. Identify administrative or other resources on campus that researchers can access to seek assistance with ethical issues they may be facing.
- vi. Communicate and present ideas to others in a clear and critical manner about complex issues, both in presentation and written format.
- vii. Engage in open and thoughtful discussions with peers on complex ethical issues.

#### **4. Assessment Scheme:**

**Case study: 25%      Assesses CILOs 2, 3, 6, 7**

In every class, students will be given one or more case studies and will engage in active discussion of either criteria of ethical research practices or issues that arise from biological research and emerging biotechnologies. The instructors will evaluate each student's performance on a scale of 0 to 5 based on both quantity and quality of their contributions. Students are encouraged to voice their opinions. *Due to the special circumstances of this semester's teaching format, students will work mostly in groups for case study, and one student will be asked to summarize the group's discussion points. **Each student must represent the group in presenting the discussion summary at least once during the semester in order to receive a passing grade.***

**Midterm: 25%      Assesses CILOs 1-5**

A written midterm exam will be given. Students will be presented with a scenario and are expected to identify potential ethical issues, to present their point of view and possible solutions and to include specific examples. A portion of the exam will also require recall of basic codes of ethics discussed in class, e.g. What is the Nuremberg Code? Basic biological concepts required to understand the case may also be tested, e.g. What makes an embryonic stem cell different from an adult stem cell?

**Final project: 40%      Assesses CILOs 2, 3, 6, 7**

Final project consists of a group presentation, done in a group of four (4) members, and an individually written project report. At the beginning of the semester, students will need to submit their contact information, research supervisor's name, and a brief one sentence description of their research/academic background. Instructors will form teams based on the information submitted, with consideration for team diversity, and announce by 7 April. Each group will be assigned a different case study. Students will work together to create a presentation to explain the ethical issues in the case, discuss the various perspectives arising from the case, and support their conclusion/resolution with references. After the presentation, students will field questions from instructors and their peers. Presentations will take place on 19 May, in class and on zoom. Each presentation will be 20 mins followed by 10 mins of Q&A. The presentation grading rubric will be made available at a later time.

**Peer evaluation: 10%      Assesses CILOs 6, 7**

Students will be asked to evaluate their peers' final project presentations, with each group being evaluated as a whole to give a "group score". Within each group, students will also receive evaluations on their contribution to the group from each teammate, which will be averaged to give an "individual score" for each student. Overall, each student will receive a final peer evaluation score that takes into account both the group score (given by rest of the class) and the individual score (given by teammates). Evaluation rubric will be provided.

#### **5. Student learning resources:**

Lecture notes and supplementary reading materials will be made available on canvas.ust.hk prior to each lecture.

## 6. Course Schedule:

Week	Date	Lecture Topic	Instructor	Lecture Content Preview
<b>PART I. RESEARCH INTEGRITY</b>				
1	25-Feb	Credit where credit is due	AW	Fundamentals of ethics; intellectual property, plagiarism, and authorship
2	3-Mar	From fake surveys to fake cells	DL	Research misconduct, fraud, and whistleblowing
3	10-Mar	How to read a science paper	DL	Accuracy and efficiency of research; conflicts of interest
<b>PART II. APPLIED ETHICS IN BIOLOGICAL RESEARCH AND BIOTECHNOLOGY</b>				
4	17-Mar	"I am your fellow man"	AW	Human subjects research and clinical trials; informed consent
5	24-Mar	God's red pencil	AW	Gene therapy; genome editing as an avenue for therapy; ethics of non-human genome editing; GMOs
6	31-Mar	Necessary costs in the name of science	DL	Benefits and harms of live organism research; animal research ethics; chimeras
<b>PART III. EMERGING BIOTECHNOLOGIES AND CONTEMPORARY ETHICAL ISSUES</b>				
7	7-Apr	<b>MIDTERM EXAM</b>		
8	14-Apr	Creating new species	AW	Non-human genome editing
11	21-Apr	Truly hidden secrets	AW	D2C genetic testing and NIPT; prognostics and diagnostics with NGS, sequencing data privacy, consent, and access
<b>FINAL PROJECT AND TEAMS ANNOUNCED</b>				
12	28-Apr	<b>Guest lecture – Prof. Chih-Hsing HO</b> Institute of European and American Studies, Academia Sinica		
9	5-May	Paradigm shift or Slippery slope?	DL	Regenerative medicine and ethical acquisition of materials; human cloning
10	12-May	A mostly misunderstood controversy	DL	Controversies, promises, and realities of stem cell therapies
13	19-May	<b>FINAL PRESENTATIONS</b>		

## 7. Academic honesty:

Since this is a course about ethics, please take care to follow basic ethical guidelines for academic integrity and honesty. You can review the HKUST Academic Honor Code here: <http://tl.ust.hk/integrity/>. Follow the link for “Information for students” and “Regulations for student conduct and academic integrity” to see examples of what is considered academic misconduct, and how to avoid it. We will also be covering plagiarism and how to avoid it in the first class. Emphatically, we have a [zero tolerance policy for plagiarism and cheating](#). All assignments will be checked by anti-plagiarism software, and **students found engaging in dishonest conduct will automatically receive a zero** for that assignment; **more than one account of such conduct will automatically result in a failing grade for the course**. So, remember to properly cite sources in your work!

## 8. Learning environment and class rules:

The case study is a large component of learning in this course, and it will only be successful if everyone actively contributes to the discussion. In this course, one of the course learning objectives is to practice discussing complicated issues that may not have a right or wrong answer, and learning how to listen to your peers' opinions, and possibly revising your own views based on these discussions. Therefore, we strongly encourage you to actively participate in the classroom discussions, and ask questions at any time; and we expect you to have a minimum level of participation in each class. Your attitude and efforts in this regard will play a large role in determining the quality of everyone's experience and learning. This is why part of the assessment will be on your preparation of the case studies before class, but also we will assess your level of engagement during the case study discussions.