

COURSE NAME; NUMBER; SEMESTER; MEETING DAYS, TIMES, AND PLACE.

Ethical and Scientific Challenges in Biotechnology

11:126:111 Spring 2024

Time and location:

section 1: Tuesdays 12:10-1:30 Cook-Douglass lecture hall 109, Wednesdays 10:20-11:40 Cook-Douglass lecture hall 103

section 2: Tuesdays 10:20-11:40, Cook-Douglass lecture hall 109; Wednesdays 12:10-1:30, Cook-Douglass lecture hall 103

CONTACT INFORMATION:

Instructor(s): Paul Meers

Office Location: 272 Foran Hall

Phone: 848-932-6230

Email: paul.meers@rutgers.edu

Office Hours: please email for appointment

COURSE WEBSITE, RESOURCES AND MATERIALS:

- Website will be set up on the Canvas system as per RU recommendation
- textbook - Introduction to Biotechnology, 4th Edition, by W. J. Thieman and M. A. Palladino

COURSE DESCRIPTION:

The purpose of this course is to survey the methods and applications of biotechnology and to examine the consequences of developments in this area. These are topics of great public interest with a pressing need for informed debate. The course is organized by topic and covers many aspects of biotechnology, including those that relate to animals, plants, microbes, human health, agriculture, medicine and the environment. A specialist guest lecturer will introduce each topic with a lecture and lead the subsequent class discussion. Students learn about the scientific basics from the textbook Introduction to Biotechnology and the lectures, and will also investigate and present viewpoints on ethical issues in various fields of biotechnology.

LEARNING GOALS:

Course learning goals:

Upon training in this course students will:

1. have knowledge of the basic approaches to biotechnology research and development, and the wide range of biotechnology applications
2. be able to address ethical and societal issues relevant to controversial applications of biotechnology
3. have gained basic oral and written communications skills in the sciences.

For Biotechnology majors, this course addresses the following Biotechnology program learning goals:

As a Biotechnology Major, each student will:

1. be able to describe the basic molecular concepts essential for understanding the field of biotechnology and the applications of biotechnology.
2. be able to find and read published scientific research in biotechnology and summarize and communicate that research effectively and critically.
3. acquire knowledge of ethical aspects of biotechnology and be able to analyze alternate viewpoints.
4. learn to work as a team in the laboratory setting or group presentations.

ASSIGNMENTS/RESPONSIBILITIES, GRADING & ASSESSMENT:

1. Readings (most weeks) from a textbook on basic biotechnology applications (and some other material for Scientific Method) are assessed by quizzes (35% of final grade). The quiz will contain questions directly on the textbook readings with 1-3 questions on the lecture material from the previous week. For 2024, quizzes will be timed online quizzes with a second chance to take the quiz, the grade being an average of the two attempts.
2. Students give oral presentations on ethical and societal aspects of biotechnology in small group format (1-3 students per group); oral presentations comprise 25% of the grade for the course.
3. Class participation (those not presenting) in group discussions is recorded and assessed as 10% of the student grade along with attendance.
4. A final term paper project assesses student ability to write about one current aspect of biotechnology and the societal issues surrounding it (30% of grade).

ADDITIONAL DETAILS:

Most reading assignments are from the required textbook Introduction to Biotechnology, 4th Edition, by W. J. Thieman and M. A. Palladino. Although this textbook is relatively expensive to purchase new, used textbooks are cheaper and there is a copy on reserve at Chang library that can be checked out for free, or the text can be rented for the semester from either Amazon or Barnes & Noble (Amazon or B & N). For each reading assignment, there will be a short timed quiz (available for 3 days) to assess your familiarity with the material in the chapter. There will be no make-up quizzes, but the lowest quiz grade for the semester will not be included in calculating your course grade. There will also be 1 homework assignment, which will be worth the same number of points as a weekly quiz.

Individual written project (30%). A writing assignment requiring independent work will be chosen from a set of themes/questions that will be provided and will be due at the end of the semester. Further details of the

project will be given out in approximately week 4 or 5.

Group Activity/Presentation (25%) For one activity, you will work in a group of 1-3 students to research a topic and present a short skit or role-playing scenario to accompany the week's lecture. Each student group will be presented with an outline of the scenario and some ideas for where to begin the research at least 2 weeks prior to the date of the group presentation.

ACCOMODATIONS FOR STUDENTS WITH DISABILITIES

Please follow the procedures outlined at <https://ods.rutgers.edu/students/registration-form>. Full policies and procedures are at <https://ods.rutgers.edu/>

ABSENCE POLICY

Students are expected to attend all classes; if you expect to miss one or two classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to me.

COURSE SCHEDULE:

Tbd – an expected schedule is shown. The actual schedule may change depending on various circumstances.

For more specific information see Quiz Information and Group Presentation Information.

Week	Assigned Reading /Homework (for discussion and lecture the following week)	Topic/lecture (weekly Tuesday class periods)	Activity/Presentation (Wednesday class periods)
1	Chapter 1.1, 1.3, 13.1; Scientific Method document	Jan 16: Intros, Discussion: <i>Ethics in Biotech</i> Paul Meers	Jan 17: Introduction to Bioethics Paul Meers
2	Chapter 2, An Introduction to Genes and Genomes (for quiz next week)	Jan 23: Discussion, <i>Scientific Method</i> Paul Meers	Jan 24: Bioethics and Scientific Method Quiz 1 (online) Paul Meers
3	Chapter 3.1, 3.2 and 6, Plant Biotechnology (for quiz next week)	Jan 30: Group 1: <i>Labeling of GM Foods</i> Quiz 2 (online)	Jan 31: Public Perception of Biotech Cara Cuite
4	Chapter 3.3-3.5, Recombinant DNA Technology and Genomics (for quiz next week)	Feb 6: Group 2: <i>Genetically engineered bananas</i> Quiz 3 (online)	Feb 7: Plant Biotech Rong Di
5	Chapter 4 Proteins as Products (for quiz next week)	Feb 13: Biofuels and Bioconversion Serpil Guran Quiz 4 (online)	Feb 14: Group 3: <i>Biofuels, Bioenergy</i>

6	Chapter 5 Microbial Biotechnology (for quiz next week)	Feb 20: Group 4: <i>Synthetic viruses</i> Quiz 5 (online)	Feb 21: Computational Design of Proteins Vikas Nanda
7	Chapter 7 Animal Biotechnology (for quiz next week)	Feb 27: Group 5 <i>Personal Pharmacogenomics</i> Quiz 6 (online)	Feb 28: Microbial Biotechnology/ DNA Sequencing Lee Kerkhof
8	Assignment – Citations and Plagiarism (no quiz next week)	Mar 5: Animal Biotechnology Amanda Jetzt Quiz 7 (online)	Mar 6: Group 6 Cloning Endangered Species
	SPRING BREAK	SPRING BREAK	SPRING BREAK
9	Chap 11.1-11.5 Medical Biotechnology	Mar 19: Group 7 <i>CRISPR babies</i> Assignment due this week.	Mar 20: Gene Therapy/Stem Cell Paul Meers
10	Chapter 10, Aquatic Biotechnology	Mar 26: Bioremediation Abigail Porter Quiz 8 (Bioremediation, online)	March 27: Group “11” <i>Bioremediation</i>
11	Chapter 11.6, 12.1-12.3	Apr 2: Group 9 <i>Hydrothermal vents</i> Quiz 9 (online)	Apr 3: Marine Biotechnology Costa Vetriani
12	Chapter 9 Bioremediation	Apr 9: Group 10 <i>Genomic information in IVF</i> Quiz 10 (online)	Apr 10: Genetic Counseling Briann Jeffreys
13	Term paper due	Apr 16: Group 8 <i>Gene Drives</i> Quiz 11 (online)	Apr 17: Biotechnology of Personal Care/Personal Genomics Rob Markowitz
14		Apr 23: Group 12: <i>Vaccines</i>	April 24: Group 13: <i>3 parent babies</i>

FINAL EXAM/PAPER DATE AND TIME

NO EXAM - Final term paper due the end of the semester (see schedule).

Absence Policy: Attendance will be taken during each class period. Students are expected to attend all classes; if you expect to miss one or two classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to us. These absences will be counted as unexcused absences. Absences will be excused only with appropriate documentation, such as a doctor’s note for illness, obituary notice for a funeral of a family member, or similar document provided to the professor for the course section. Studying for an exam, working at a job, attending a social gathering or vacation are not acceptable reasons for an excused absence. Under the current situation, there will be appropriate consideration of extenuating circumstances.

1 or 2 unexcused absences are allowed without penalty. A third unexcused absence will be penalized by subtracting 3 points from the final grade based on 100 points. Each successive absence will result in the loss of 3 additional points.

ACADEMIC INTEGRITY

Turnitin plagiarism detection software will be used to scan assignments for copied and improperly attributed material.

The university's policy on Academic Integrity is available at <http://academicintegrity.rutgers.edu/academic-integrity-policy>. The principles of academic integrity require that a student:

- properly acknowledge and cite all use of the ideas, results, or words of others.
- properly acknowledge all contributors to a given piece of work.
- make sure that all work submitted as his or her own in a course or other academic activity is produced without the aid of impermissible materials or impermissible collaboration.
- obtain all data or results by ethical means and report them accurately without suppressing any results inconsistent with his or her interpretation or conclusions.
- treat all other students in an ethical manner, respecting their integrity and right to pursue their educational goals without interference. This requires that a student neither facilitate academic dishonesty by others nor obstruct their academic progress.
- uphold the canons of the ethical or professional code of the profession for which he or she is preparing.

Adherence to these principles is necessary in order to ensure that

- everyone is given proper credit for his or her ideas, words, results, and other scholarly accomplishments.
- all student work is fairly evaluated and no student has an inappropriate advantage over others.
- the academic and ethical development of all students is fostered.
- the reputation of the University for integrity in its teaching, research, and scholarship is maintained and enhanced.

Failure to uphold these principles of academic integrity threatens both the reputation of the University and the value of the degrees awarded to its students. Every member of the University community therefore bears a responsibility for ensuring that the highest standards of academic integrity are upheld.

STUDENT WELLNESS SERVICES

Just In Case Web App <http://codu.co/cee05e>

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901/ www.rhscaps.rutgers.edu/

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Scarlet Listeners

(732) 247-5555 / <https://rutgers.campuslabs.com/engage/organization/scarletlisteners>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.