

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

Animal Microtechniques and Tissue Culture (11:067:430; 4 credits) Spring, 2024

Lecture:	Sections 1 and 2 –	12:10-1:30 Mon,	138A Foran Hall
Lab:	Section 1 –	8:30 – 11:30 Wed,	104 Foran Hall
		8:30 – 9:50 Fri,	104 Foran Hall
	Section 2 –	12:10 – 3:30 Wed,	104 Foran Hall
		10:20 – 11:40 Fri,	104 Foran Hall

CONTACT INFORMATION:

Instructor: Mehmet Uzumcu, *Course Coordinator*

Office Location: 119 Bartlett Hall

Phone: 848-932-6912 email: Uzumcu@rutgers.edu

Office Hours: By appointment

Instructor: Carol Bagnell

Office Location: 126B Foran Hall

Phone: 848-932-6334 email: carol.bagnell@rutgers.edu

Office Hours: By appointment

Instructor: Amanda Jetzt

Office Location: 108, Foran Hall

Phone: 848-932-6258, email: jetzt@sebs.rutgers.edu

Office Hours: By appointment,

COURSE WEBSITE, RESOURCES AND MATERIALS:

- Text (recommended): Culture of Animal Cells, 7th ed., by R. Ian Freshney. Wiley-Liss, Hoboken, NJ (2016). You can reach the [electronic edition](#) of the book through RU Libraries. The book is supplementary. The exams will be based on materials discussed in the lectures and labs.
- Announcements, lab protocols, lecture notes, additional reading material and grades will be available on the Canvas course website: <https://canvas.rutgers.edu/>

COURSE DESCRIPTION:

This course provides students with the skills and knowledge to work in a modern biological research laboratory making use of cell culture techniques. Emphasis is placed on aseptic techniques for animal cell culture, the requirements for cell growth *in vitro*, mechanisms underlying cellular differentiation, immunohistochemistry (IHC) and *in situ* hybridization (ISH), the expression of transfected DNA in cultured animal cells, microdissection, organ culture, and PCR genotyping.

PREREQUISITES: General Biology (11:119:115 and 11:119:116)

LEARNING GOALS:

Animal Sciences Program Learning Goals (PLGs):

1. Apply biological and chemical principles and quantitative reasoning to concepts presented in core subject areas in Animal Science such as physiology, nutrition, genetics, and reproduction. (PLG 2)
Assessment: Three (3) hourly exams and weekly pre-lab quizzes
2. Develop oral and written communication skills to effectively deliver understanding of laboratory animal science. (PLG 6)

Assessment: Five (5) laboratory reports

Course Learning Goals:

1. To master basic cell culture procedures and their application in experiments typical of a modern biological research laboratory. To learn IHC, ISH, organ culture, microdissection, and PCR genotyping.
2. To effectively analyze experimental data and present the results in an understandable research format using computer based scientific programs.
3. To apply good writing skills to effective scientific communication of experimental results.

ASSIGNMENTS/RESPONSIBILITIES & ASSESSMENT:

Students will be assessed based on their performance on the following tasks:

5 Laboratory Reports @ 10% each 50%

3 Hourlies @ 13.33% each 40%

Lab Quizzes 10%,

As a laboratory course, the major emphasis in grading will be placed on the skills and knowledge that students will master during the performance of the laboratory exercises and experiments, as assessed by their ability to apply that knowledge in the laboratory reports. There will also be three hourly exams on both the lecture and lab material. In addition, weekly quizzes will be administered at the start of each lab period. Finally, student participation (timely arrival; preparedness) in the lab will also be assessed. Lab reports will be due one week following the completion of each experiment. Electronic versions of each report will need to be submitted. The reports will be scanned by Turnitin and for the inappropriate use of artificial intelligence (AI).

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.

If you have a medical excuse for missing an exam, please notify me at least 24 hrs prior to the exam with appropriate documentation. Also, if you have standing religious observations/holidays, please contact me immediately at the start of the semester.

Grading scheme:

A: 100-89.5%, B+: 84.5-<89.5%, B: 79.5-<84.5%, C+: 74.5-<79.5%, C: 69.5-<74.5%, D: 60-<69.5%, F: <60%.

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/>. If you need accommodation for disability, provide the documentation to the instructor at the beginning of the semester.

COURSE SCHEDULE:

Week	Date	Lecture / Lab Topic - Instructor	Readings	Assignment, Quiz & Exam Schedule
1	Mon 1/22	Lecture 1: Introduction – Biology of the Cultured Cell Dr. Uzumcu	Chapters 1 and 2	Assignment #1 = Quiz #1: Standard Curves Due: 2 nd week, Mon.
	Wed 1/24	Lab Exercise #1 Demonstration of Sterile Technique Dr. Uzumcu		Quiz #2: <i>In the lab</i>
	Fri 1/26	Feed and Observe Cells Dr. Uzumcu		
2	Mon 1/29	Lecture 2: The Culture Environment Dr. Uzumcu Feed and Observe Cells	Chapters 4 and 7	Assignment #1 = Quiz #1 due (online submission)
	Wed 1/31	Lab Exercise #2 Basic Calculations, Dr. Uzumcu Passage and Culture of MDBK Cells		
	Fri 2/2	Feed and Observe Cells Dr. Uzumcu		
3	Mon 2/5	Lecture 3: Defined Culture Media Dr. Uzumcu	Chapters 8 and 9	
	Wed 2/7	EXPT # 1: MDBK Growth Curves Effect of Fetal Bovine Serum Dr. Uzumcu		Quiz #3: <i>In the lab</i>
	Fri 2/9	MTS addition to cells Dr. Uzumcu		
4	Mon 2/12	Lecture 4: Primary Culture, Subculture, and Cell Lines Dr. Uzumcu	Chapters 11 and 12	
	Wed 2/14	EXPT # 1: Complete Cell Growth Curves, Data Analysis Dr. Uzumcu		
	Fri 2/16	Review Data Analysis Dr. Uzumcu		
5	Mon 2/19	Lecture 5: Cell Differentiation The Basics Dr. Bagnell	Chapter 2.4	
	Wed 2/21	EXPT #2: Adipocyte Differentiation 3T3-L1 cells Dr. Jetzt		Quiz #4: <i>In the lab</i> Lab Report #1 due – Cell Growth Curves
	Fri 2/23	Refeed and Observe Cells Dr. Jetzt		

Week	Date	Lecture / Lab Topic - Instructor	Readings	Assignment, Quiz & Exam Schedule
6	Mon 2/26	Lecture 6: Cell Differentiation 2 Dr. Bagnell Refeed and Observe Cells -Dr. Jetzt	Chapter 19	
	Wed 2/28	EXPT #2 (con't) Adipocyte Differentiation - Image cells, Protein + Enzyme Assays Dr. Jetzt		Quiz #5 <i>In the lab</i>
	Fri 3/1	Overview and Analysis Dr. Jetzt		
7	Mon 3/4	EXAM 1 Material from 1/22/2024 – 2/16/2024		
	Wed 3/6	DEMONSTRATION: 3D Cell Culture Dr. Bagnell		
	Fri 3/8	No class		Lab Report #2 due - Cell Differentiation and Adipogenesis
8		SPRING BREAK		
9	Mon 3/18	Lecture 7: Gene Transfer Techniques Dr. Jetzt		
	Wed 3/20	EXPT # 3: Liposome-Mediated Cell Transfection Dr. Jetzt		Quiz #6 <i>In the lab</i>
	Fri 3/22	Harvest and freeze transfected cell extracts Dr. Jetzt		
10	Mon 3/25	Lecture 8: Contamination and Cryopreservation Dr. Jetzt	Chapters 14 and 15	
	Wed 3/27	EXPT # 3: Liposome-Mediated Cell Transfection (cont.) Dr. Jetzt Total cell protein and β -galactosidase activity assays		Quiz #7 <i>In the lab</i>
	Fri 3/29	EXAM 2 Material from 2/19/2024 – 3/29/2024		
11	Mon 4/1	Lecture 9: Immunohistochemistry (IHC) I - Dr. Bagnell		

Week	Date	Lecture / Lab Topic - Instructor	Readings	Assignment, Quiz & Exam Schedule
	Wed 4/3	EXPT # 4: IHC Localization of Proteins - Dr. Bagnell		Quiz #8 <i>In the lab</i> Lab Report #3 due – Transfections
	Fri 4/5	How to record and present quantitative IHC results - Dr. Bagnell		HW assigned
12	Mon 4/8	Lecture 10: IHC II and In Situ Hybridization – Dr. Bagnell		
	Wed 4/10	EXPT # 4: IHC Localization -Data Analysis - Dr. Bagnell		HW = Quiz #9 due
	Fri 4/12	No follow up lab		
13	Mon 4/15	Lecture 11: Embryo organ culture – Dr. Uzumcu		
	Wed 4/17	EXPT # 5: Embryo gonadal & genetic sex identification - Dissection, sex ID, and tissue collection – Dr. Uzumcu		Quiz #10 <i>In the lab</i> Lab Report # 4 due – IHC
	Fri 4/19	DNA extraction - Dr. Uzumcu		
14	Mon 4/22	Lecture 12: PCR and Apoptosis Detection Methods – Dr. Uzumcu		
	Wed 4/24	EXPT # 5: Embryo gonadal & genetic sex identification – PCR set up Dr. Uzumcu		Quiz # 11 <i>In the lab</i>
	Fri 4/26	Agarose gel electrophoresis, gel imaging, and data analysis – Dr. Uzumcu		
15	Mon 4/29	Pre-exam # 3 Review Drs. Bagnell and Uzumcu		Lab Report # 5 due – Embryonic gonadal and genetic sex identification
	Thurs 5/2	EXAM 3 Material from 4/1/2024 – 4/29/2024 During Finals Week (Thu, 5/2, 12-2 PM)		

ACADEMIC INTEGRITY

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.

Cheating on exams deprives of you of the educational benefits of the course materials. It is also unfair since it gives you an undeserved advantage over your fellow students who are graded on the basis of their own work. In this class, all cheating will be taken very seriously. All suspected cases of cheating will be automatically referred to relevant University office, and penalties appropriate to the gravity of the infraction will be recommended.

STUDENT WELLNESS SERVICES

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. NJ Hopeline (1.855.654.6735) and National Suicide Hotline (988 in addition to CAPS also can be used.

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/getting-registered>.

Other resources:

DoSomething button through Rutgers Dean of Students office

<http://health.rutgers.edu/do-something-to-help/>

Wellness Coaching through Rutgers HOPE

<http://health.rutgers.edu/education/hope/wellness-coaching/>

Self-Help Apps found on the Rutgers Student Health website:

<http://health.rutgers.edu/education/self-help/self-help-apps/>

SEBS DEI STATEMENT

It is our intention that students of all backgrounds will be well served by this course. We will work to create an environment of inclusion which respects and affirms the inherent dignity, value, and uniqueness of all individuals, communities, and perspectives. We are lucky to have a diverse university. Diverse voices and life experiences enhance the learning process, and we welcome students to share their personal experiences. We will not tolerate disrespectful language or behavior against any individual or group. If you feel as though you have been disrespected or treated unfairly by the instructors or any other individual, please let us know. You may speak with the instructors in person, over email or report anonymously via the Office of Academic Programs. In addition, you may also report bias to the Rutgers Diversity and Inclusion initiative using this link: <http://inclusion.rutgers.edu/report-bias-incident/>