

Course title: CELL BIOLOGY WITH GENETICS
Course coordinator: Alena Buretić-Tomljanović, PhD, Full Professor
Department: Medical Biology and Genetics
Study program: Integrated Undergraduate and Graduate University Study of Dental Medicine in English
Course status: compulsory
Year: first year
Academic Year: 2022/2023

SYLLABUS

Code					
Study program	Integrated Undergraduate and Graduate University Study of Dental Medicine in English				
Course title	Cell Biology with Genetics			Year	I.
	Lectures	Seminars	Practicals	Total	ECTS
Course structure	30	30	30	90	5.5
Explanation: ECTS coefficient 5.5 (5.5x30h) means 165 of total hours of work, i.e. 41.5 hours of work per week (including lectures, seminars and practicals)					
Coordinator	Alena Buretić-Tomljanović, PhD, Full Professor			alenabt@medri.uniri.hr	
Website:	http://www.medri.uniri.hr ;				
Lecturers	Saša Ostojić, MD, PhD, Full Professor Nada Starčević-Čizmarević, PhD, Associate Professor Jadranka Vraneković, PhD, Associate Professor Sanja Dević Pavlić, PhD, Assistant Professor Anita Barišić, MD, PhD Tea Mladenić, Assistant				
Collaborators	Magda Trinajstić Zrinski, DMD, PhD				

COURSE DESCRIPTION (Course information, basic description, general information, teaching overview, required equipment and preparation, etc.)

The focus of Cell Biology with Genetics is the study of the structure and function of the cell but also the functional interaction of the cell with its microenvironment. In this course, we will focus on Eukaryotic cell biology and will cover topics, such as membrane structure and composition, transport, and trafficking, the cytoskeleton and cell movement, the breakdown of macromolecules, and the generation of energy and the integration of cells into tissues.

We will also cover important cellular processes such as cell division, cell cycle regulation, signal transduction, apoptosis (programmed cell death), cancer cell biology, and biology of reproduction.

Furthermore, we will give insight into the fundamentals of molecular and systems biology, the flow of genetic information, human genome architecture, and the basics of medical genetics. Throughout the semester we will attempt to relate defects in these various cellular processes to human diseases to help gain a better understanding of what happens when cells don't work properly.

Classes are centered on discussion-oriented lectures and seminars that encourage critical thinking and emphasize the significance of research as a tool for obtaining knowledge. The practical part exposes students to an overview of modern cell-related and molecular biology-related techniques and offers a hands-on experience in classical cell biology experiments.

GENERAL INSTRUCTIONAL AIMS

During the course the students should acquire the following skills:

1. Oral and written communication,
2. The usage of information technology,
3. Evidence-based critical thinking and problem-solving
4. Individual and group work
5. Finding relevant scientific literature and acquiring scientific terminology

SPECIFIC LEARNING OUTCOMES: At the end of the course the student will be able to:

1. Describe the fundamental principles of cellular biology and apply them to current biological issues,
2. Understand how the cell structure relates to its functions,
3. Understand cell movement and how it is accomplished,
4. Understand how cells grow, divide, and die and how these processes are regulated,
5. Understand cell signaling and how it regulates cellular functions,
6. Understand how dysregulation of signaling processes leads to cancer and other diseases,
7. Interpret the behavior of cells in their microenvironment in multi-cellular organisms (i.e., a cell within its social context) with emphasis on cell-cell interactions, cell-extracellular matrix interactions,
8. Use the light microscope and prepare the slides,
9. Understand the main principles of Prokaryotic and Eukaryotic gene and genome organization, genome architecture, gene function, and regulation,
10. Understand the basic genetic mechanisms and the mechanisms of genome maintenance,
11. Classify chromosomal and gene mutations,

12. Understand basic and advanced cytogenetic and molecular-genetic methods in mutation detection and differential genetic diagnosis,
13. Calculate and interpret the recurrence risk for monogenic and polygenic human diseases,
14. Understand the methods and results of scientific research in the field of cell and molecular biology,
15. Integrate the knowledge of different educational units; acknowledge the interdisciplinary nature of the biomedicine field.

COURSE ASSESSMENT TOOLS

(Important dates):

Midterm exam 1: October 25, 2022; Tuesday, (28%)

Midterm exam 2: November 2, 2022; Tuesday, (28%)

FINAL EXAM: November 8-9, 2022 – comprehensive (44%)

CLASS FORMAT

The course will be held in the autumn term between October 1st and October 29th, 2022 (4 weeks) and will consist of twenty-two-hour class sessions per week (for four weeks). The schedule for the lectures, seminars and practicals along with the assigned lecturers and readings are listed in the tables titled “Course Teaching Plan” and „Course Schedule“ (below). Class session dates and time may vary with advance notice. Homework and pre-class assignments will be required for several classes, mostly seminars. Pre-class assignments will be posted on Merlin. It is advisable that students log into the course on Merlin and check for updates regularly. Lectures and Seminars will be held in the library of the Department of Medical Biology and Genetics.

Practicals will be held in the practicum of the Department of Medical Biology and Genetics (2nd Floor, east wing of the building).

Assigned reading:

1. Cooper, Geoffrey M; Hausman, Robert E. The Cell. A Molecular Approach. Sinauer Associates, Inc. Publishers Sunderland, Massachusetts U.S.A., Seventh Edition, ISBN 978-1-60535-290-9
2. Turnpenny, P; Ellard, S. Emery’s ELEMENTS of MEDICAL GENETICS, Elsevier, 15th Edition, ISBN 978-0-7020- 6685-6
3. Cell Biology with Genetics workbook (a collection of practicals and seminars with problem assignments)

Optional / additional reading.

- 1) Alberts B et al.: Molecular Biology of the Cell, Philadelphia, Sixth Edition, Garland Publ. Co, 2015., ISBN 978-0-8153-4464-3

COURSE TEACHING PLAN

List of lectures, seminars, and practicals

	LECTURES (Topic)	Teaching Hours	Lecture Room
L1	Plan; literature	1	Dept. of Biology
L2	Introduction to Cell Biology. Cell and Molecular Biology in Medicine	1	Dept. of Biology
L3	Cell Origin and Evolution	1	Dept. of Biology
L4	Tools of Cell Biology	1	Dept. of Biology
L5	The Compartmentalization of Cells	1	Dept. of Biology
L6	Structure of The Plasma Membrane	1	Dept. of Biology
L7	Bioenergetics	1	Dept. of Biology
L8	Cytoskeleton, the Extracellular Matrix and Cell-Cell Interactions	1	Dept. of Biology
L9	Regulation of the Cell Cycle	1	Dept. of Biology
L10	The Basics of Cell Signaling	1	Dept. of Biology
L11	Protein Sorting and Transport in Eukaryotic cell; Endocytic and Secretion pathways. Vesicular transport. Biogenesis of the lysosomes and peroxisomes.	1	Dept. of Biology
L12	Basics of Human Cytogenetics	1	Dept. of Biology
L13	Numerical Aberrations of Human Chromosomes	1	Dept. of Biology
L14	Eukaryotic Gene Organization	1	Dept. of Biology
L15	Genome Organization in Prokaryotes and Eukaryotes. The Human Genome	1	Dept. of Biology
L16	Human Genome Variation and Pharmacogenetics	1	Dept. of Biology
L17	The Structure and Topological Organization of Chromatin	1	Dept. of Biology
L18	The Nuclear Envelope and Chromosome Territories; The Nuclear Bodies	1	Dept. of Biology
L19	Basic Genetic Mechanisms: DNA Replication	1	Dept. of Biology
L20	Molecular Basis of Gene Mutations	1	Dept. of Biology
L21	Monogenic and Polygenic Human Disorders	1	Dept. of Biology
L22	DNA Repair	1	Dept. of Biology
L23	Programmed Cell Death	1	Dept. of Biology
L24	Regulation of Transcription; mRNA processing	1	Dept. of Biology
L25	Posttranscriptional Control of Gene Expression		Dept. of Biology
L26	mRNA translation. Posttranslational Modifications of Proteins. Protein Degradation: Ubiquitin-Proteasome Pathway.	1	Dept. of Biology
L27	The Development and Causes of Cancer	1	Dept. of Biology
L28	Molecular Oncogenesis: Abnormal Cell Cycle in Malignancy	1	Dept. of Biology
L29	Tools of Molecular Biology I	1	Dept. of Biology
L30	Tools of Molecular Biology II	1	Dept. of Biology

		Total:	30	
	Seminars (Topics)	Teaching Hours	Lecture Room	
S1	Cell chemistry. Three Domains of Life. Prokaryotic and Eukaryotic Cells.	2	Dept. of Biology	
S2	Transport of Small Molecules and Macromolecules	2	Dept. of Biology	
S3	The Structure and Function of Nucleic Acids.	2	Dept. of Biology	
S4	Cell Signaling in Tooth Development	2	Dept. of Biology	
S5	Problems: Protein and Lipid Sorting, Transport, and Other Topics of Cell Biology	2	Dept. of Biology	
S6	Mechanisms of Aneuploidy and Polyploidy	2	Dept. of Biology	
S7	Human Chromosomal Rearrangements I	2	Dept. of Biology	
S8	Human Chromosomal Rearrangements II	2	Dept. of Biology	
S9	Human Fertilization and Early Embryonic Development	2	Dept. of Biology	
S10	Mendelian and Non-Mendelian Inheritance	2	Dept. of Biology	
S11	Genetic Abnormalities of Orofacial Structures	2	Dept. of Biology	
S12	Problems: The Flow of Genetic Information - from DNA to Protein	2	Dept. of Biology	
S13	Epigenetics: DNA Methylation, Noncoding RNAs, Genomic Imprinting	2	Dept. of Biology	
	I. Midterm exam	2		
	II. Midterm exam	2		
	Total:	30		
	Practicals (content)	Teaching Hours	Lecture Room	
P1	Basics of Light Microscopy.	2	Dept. of Biology	
P2	Prokaryotic cell.	2	Dept. of Biology	
P3	Eukaryotic cell.	2	Dept. of Biology	
P4	Mitosis in Plant and Animal Cells.	2	Dept. of Biology	
P5	Meiosis and Gametogenesis.	2	Dept. of Biology	
P6	Human Chromosomes	2	Dept. of Biology	
P7	Genomic DNA Extraction	2	Dept. of Biology	
P8	The Relationship Between Chromatin Structure and Transcriptional Activity	2	Dept. of Biology	
P9	Genotoxicity of Materials in Dental Medicine	2	Dept. of Biology	
P10	Patterns of Disease Inheritance	2	Dept. of Biology	
P11	Population Genetics	2	Dept. of Biology	
P12	Genetic Counselling: problems	2	Dept. of Biology	

P13	Tumor Cell Biology: Molecular Oncogenesis in Clinical Practice	2	Dept. of Biology
P14	Tools of Molecular Genetics	2	Dept. of Biology
P15	Consultations	2	Dept. of Biology
Total:		30	

Students' obligations:

1. ATTENDANCE

Students are advised to attend all classes to avoid missing out on the material presented in class. In return, the students can benefit from each other's contributions in class discussions. In case of absence from any class, the students are required to cover the material missed and inquire about any announcements made during their absence. STUDENTS WHO ATTENDED LESS THAN 70% OF LECTURES, SEMINARS, OR PRACTICALS HAVE FAILED THE COURSE.

2. PARTICIPATION

Lectures:

Students should listen to the lectures and take detailed notes. They should be prepared to participate by taking occasional quizzes and by asking questions.

Seminars:

Obligatory preparation and active participation are required (assignment readings and working tutorials will be set before seminars). Working in small groups is an important aspect of seminar activity. Students are encouraged to prepare questions and actively engage with the lecturer to reach a conceptual understanding of the topic.

Online forum & homework:

The online forum is an example of an individual student's out-of-class activity. Several research assignments or take-home assignments (homework) may be given during the semester at *Merlin*. This activity may bring students 4 additional credits.

Practicals:

Students generally do not need to prepare for practicals. They need drawing equipment (a pencil, crayons, a rubber, etc.) and a white (laboratory) coat.

3. EXAMINATION

Midterm exams and the final exam are obligatory. Midterm exams 1 and 2 are scheduled for the 3rd and 5th week.

Students arriving more than 10 minutes late for an exam will not be allowed to take the exam. In addition, under no circumstances will students be able to take an exam once other students have completed the exam.

ASSESSMENT (Exam taking, detailed exam description oral/written/practical part, point distribution, grading criteria):

1. ASSESSMENT OF STUDENTS' WORK (EXAMS)

Student assessment is carried out according to the current Regulations on Studies of the University of Rijeka.

Students may obtain a total of 100 credits: a maximum of 56 credits during the course and a maximum of 44 credits on the final exam (**Table 1**). Students must gain a minimum of 28 credits to be allowed to take the final exam. Those students who did not gain the required 28 credits (because of illness or other relevant reasons) will be given the opportunity to obtain the required credits after classes are over, but before taking the final exam. The latest grading scale is valid. The grading scale is valid for the current academic year.

Table 1. Distribution of Credits in the Cell Biology with Genetics Course

Activity	Max. Credits
Attendance (lectures, practicals, individual and group work in seminars)	0
Midterm exams 1 and 2	56 (2 x 28)
Final exam (written and oral part)	44 (14 + 30)
Total	100

Throughout the course, students have two OBLIGATORY in-class midterm exams consisting of 40 multiple-choice questions each. Each correct answer is worth 0.7 credits (Table 2). Therefore, each midterm exam is worth max. 28 credits, and two midterm exams together are worth max. 56 credits. The final exam, taking place after classes are over, consists of a written and oral part. The written part has 20 multiple-choice questions. Each correct answer is worth 0.7 credits ($20 \times 0.7 = 14$). Each midterm exam takes about 60 minutes to complete while the written part of the final exam takes about 30 minutes to complete. The distribution of credits for midterm exams is presented in Table 2.

Table 2. Midterm examination – result evaluation

Percentage (%)	No. of correct answers	Credits
90 - 100	36 - 40	25,2 – 28,0
75 - 89,9	30 - 35	21,0 – 24,5
60 – 74,9	24 – 29	16,8 – 20,3

50 – 59,9	20 - 23	14,0 – 16,1
0 – 49,9	0 - 19	0

Exams will be based on the content of the lectures, seminars, practicals and assigned reading; however, the material covered in class will be emphasized. The final exam will be comprehensive.

If students, by taking two midterm exams, gain a total of 28.0 credits, they are allowed to take the final exam,

In the written part of the final exam, which weighs max.14 credits, the students must give a correct answer to at least 50% of multiple-choice questions (i.e., 10 questions) to pass. The written part of the final exam is a prerequisite for the oral part. In case the student passes the oral examination, he/she may gain min. 12 (40%) and max. 30 credits. The distribution of credits on the final exam is presented in Tables 3 and 4. Ten questions will be asked; each answer is worth from 0 to 3.0 credits.

Table 3. Final Exam (written part) – result evaluation

Percentage (%)	No. of correct answers	Credits
91 - 100	19 - 20	13,3 – 14,0
81 - 90	17 - 18	11,9 – 12,6
71 – 80	15 - 16	10,5 – 11,2
61 – 70	13 - 14	9,1 – 9,8
51– 60	11 - 12	7,7 – 8,4
50	10	7,0
< 50	< 10	0

Table 4. Final Exam (oral part) – result evaluation

Grade	Credits
sufficient	12,0 - 30,0
unsufficient	< 12,0

FINAL GRADING CRITERIA:

A (5) – 90-100%,
B (4) – 75-89.99%,
C (3) – 60 – 74.99%,
D (2) – 50 – 59.99%,
F and FX (1) – <50%

The final grading is presented in Table 5.

Table 5. Final Grading

	No. of correct answers	Credits	Percentage (%)	Final Grade
1. Midterm exam	40	28,0	40	
2. Midterm exam	30	21,0	30	
Final exam – written	15	10,5	15	
Final exam - oral	-	22,0	-	
<i>Total</i>		<i>81,5 / 100</i>		
<i>Final Grade</i>				B

Students will have the opportunity to prepare a written essay or a PowerPoint presentation on a topic approved by the course coordinator. The topic must be related to the course content. This activity IS NOT obligatory; however, it may bring students up to 8 additional credits. Furthermore, students will have the opportunity to take some learning activities on Merlin; this additional effort might bring up to 4 additional credits.

Table 6. Summary of the Course Activities and Grading

Activity	Detailed Activity		Max. Grade Points
Attendance (lectures)	- active participation, - discussion		0
Attendance (practicals)	- slide preparation, - microscopy - problem-solving	– individual work to pursue students' competence	0
Attendance (seminars)	- individual and group work, problem-solving, results' presentation	– obligatory preparation for the class (reading or research assignment)	0
Midterm exam 1	- objective evaluation of knowledge using multiple-choice questions	- includes content from L1-L16 S1 – S9, P1 – P6	28
Midterm exam 2	- objective evaluation of knowledge using multiple-choice questions	- includes content from L17-L30 S9 - S13, P7 - P14	28
Final exam	- written and oral examination	- includes content L1 - L40, P1 - P14, S1 - S13 (comprehensive)	44
Essay writing or PowerPoint presentation	- presentation of scientific knowledge and results – OPTIONAL	- competence in reading and presenting scientific content; - ability to present scientific content briefly and clearly	8
Activities in Merlin	- lectures, dictionary, homework assignments - OPTIONAL	- learning through problem assignment and term description	4
	Total		100 +12

Possibility of teaching in another language:

Croatian

Other important information regarding the course:

All information regarding lectures, reading assignments, and homework will be posted on the Merlin website which may be entered on <https://moodle.srce.hr/2021-2022/>.

Correspondence: For questions or concerns, please feel free to send us a message by email or by using the Merlin website and we will do our best to respond within 24 to 48 hours. Only

students who are registered for the course will have access to the Merlin website protected under a password. The password will be given by the course coordinator. If you cannot access the website, inform prof. Buretić-Tomljanović at alenabt@uniri.hr. Students are expected to check their Merlin accounts frequently for important course updates/information.

Office visits: If you want to speak with us during office hours, please let us know by email or in class.

Academic policies: As a student enrolled in this course and at the University of Rijeka you should be familiar with the policies that govern the institution's academic processes. For example, Academic Dishonesty, Enrollment Status, and Grades and Grading. Please read the Undergraduate Academic Policies at www.uniri.hr, www.medri.hr and <http://medical-studies-in-english.com/>.

Academic dishonesty by students enrolled in undergraduate and graduate courses and programs offered by the Department of Biology and Medical Genetics will not be tolerated. Academic dishonesty includes, but is not limited to:

1. Obtaining assistance from another individual during an examination.
2. Giving assistance to another individual during an examination.
3. The unauthorized use of study material or textbooks during an examination.
4. Changing answers on a test after it has been returned and then submitting it for regrading.
5. Plagiarizing written assignments. Plagiarizing includes but is not limited to: a) copying laboratory reports from previous years, b) copying or paraphrasing reports, term papers, or those prepared by other students, c) unauthorized collaboration in the preparation of reports, term papers, or theses, and d) use of another author's materials without appropriate acknowledgment through quotation and citation.
6. Attempting to bribe or otherwise induce an instructor to alter either a grade or examination score

COURSE SCHEDULE (Autumn Semester; for academic year 2022/2023)

1st week					
TUESDAY	Oct. 4, 2022.	11:15-14:00	L1, L2, L4	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
		14:15-15:45	P1	Anita Barišić, MD, PhD	Dept. of Biology, practical room
WEDNESDAY	Oct. 5, 2022	12:15-14:00	L5, L6	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
		14:15-15:45	P2	Anita Barišić, MD, PhD	Dept. of Biology, practical room
THURSDAY	Oct. 6, 2022	9:15-11:00	L3, L7	Prof. Saša Ostojić, MD, PhD	Dept. of Biology, library
		11:15-13:00	L8, L9	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
FRIDAY	Oct. 7, 2022	09:15-10:45	P3	Tea Mladenić, Assistant	Dept. of Biology, practical room

		11:15-13:00	L10, L11	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
		13:15-14:45	S1	Anita Barišić, MD, PhD	Dept. of Biology, library
2nd week					
TUESDAY	Oct. 11, 2022	10:15-11:45	S2	Asst. Prof. Vraneković, PhD	Dept. of Biology, library
		12:15-14:00	L12, L13	Prof. Vraneković, PhD	Dept. of Biology, library
		14:15-15:45	S3	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
WEDNESDAY	Oct. 12, 2022	8:15-9:45	P4	Prof. Starčević Čizmarević, PhD	Dept. of Biology, practical room
		10:15-11:45	P5	Anita Barišić, MD, PhD	Dept. of Biology, practical room
		12:15-13:45	P6	Prof. Vraneković, PhD	Dept. of Biology, library
THURSDAY	Oct. 13, 2022	10:15-11:45	S5	Prof. Vraneković, PhD	Dept. of Biology, library
		12:15-14:00	L14, L15	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
FRIDAY	Oct. 14, 2022	09:15-10:45	S4	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, library
		11:15-14:00	L16, L17, L18	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
3 rd week					
TUESDAY	Oct. 18, 2022	9:15-10:45	S6	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
		11:15-12:45	S7	Prof. Vraneković, PhD	Dept. of Biology, library
		13:15-14:45	P7	Prof. Starčević Čizmarević, PhD	Dept. of Biology, practical room
WEDNESDAY	Oct. 19, 2022	09:15-11:00	L24, L25	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
		11:15-12:45	S8	Prof. Vraneković, PhD	Dept. of Biology, library
		13:15-14:45	P8	Prof. Vraneković, PhD	Dept. of Biology, practical room
THURSDAY	Oct. 20, 2022	09:15-11:00	L19, L20	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
		11:15-12:00	L22	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, library
		12:15-13:45	P9	Magda Trinajstić Zrinski, DMD, PhD	<i>online</i> (MS Teams)
FRIDAY	Oct. 21, 2022	9:15-10:45	S9	Anita Barišić, MD, PhD	Dept. of Biology, library

		11:15-12:45	S10	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, library
		13:15-14:45	P10	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, practical room
4 th week					
TUESDAY	Oct. 25, 2022	9:00-10:30	1 st Midterm	Prof. Buretić-Tomljanović, PhD	online (Merlin, MS Teams)
		11:15-12:00	L21	Anita Barišić, MD, PhD	Dept. of Biology, library
		12:15-13:00	L23	Prof. Vraneković, PhD	online (Merlin)
WEDNESDAY	Oct. 26, 2022	10:15-11:00	L26	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
		11:15-12:00	L27	Prof. Saša Ostojić, MD, PhD	Dept. of Biology, library
		12:15-13:45	P11	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, library
		14:15-15:45	P12	Anita Barišić, MD, PhD	Dept. of Biology, library
THURSDAY	Oct. 27, 2022	09:15-10:00	L28	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
		10:15-11:45	S12	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
		12:15-14:00	L29 L30	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
FRIDAY	Oct. 28, 2022	10:15-11:45	P13	Tea Mladenić, Assistant	Dept. of Biology, practical room
		12:15-13:45	P14	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
		14:15-15:45	S13	Anita Barišić, MD, PhD	Dept. of Biology, practical room
5 th week					
TUESDAY	Nov 8, 2022		2nd Midterm Exam		online (Merlin, MS Teams)
FRIDAY	Nov 11, 2022		FINAL EXAM		online/onsite

OTHER FINAL EXAM TERMS	
2nd term	11/25/2022
3rd term	01/20/2023
4th term	06/30/2023
5 th term	09/15/2023
1 st Midterm Retake	01/18/2023

2 nd Midterm Retake	01/19/2023
1 st Midterm Retake	06/27/2023
2 nd Midterm Retake	06/28/2023
1 st Midterm Retake	09/13/2023
2 nd Midterm Retake	09/14/2023