



Sveučilište u Rijeci • Fakultet dentalne medicine
University of Rijeka • Faculty of Dental Medicine

Course: 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

Study year: 1

Academic year 2021/22

SYLLABUS

Course description (a brief description of the course, general instructions, where and in what form the lessons are organized, necessary equipment, instructions for attendance and preparation for classes, student obligations, 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 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

Midterm exam 1: October 15, 2021; Friday, (28%)

Midterm exam 2: October 28, 2021; Thursday, (28%)

FINAL EXAM: October 29, 2021 – comprehensive (44%) CLASS FORMAT

The course will be held in the autumn term between October 1st and October 29th, 2021 (4 weeks) and will consist approximately of twenty five-hour class sessions per week (during 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. All 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:

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:

The list of lectures (with topics and descriptions):

	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	Transport of Macromolecules: Endocytosis and Exocytosis.	1	Dept. of Biology
L8	Bioenergetics	1	Dept. of Biology
L9	Cytoskeleton and Cell Movement	1	Dept. of Biology
L10	The Extracellular Matrix and Cell-Cell Interactions	1	Dept. of Biology
L11	Regulation of the Cell Cycle	1	Dept. of Biology
L12	The Basics of Cell Signaling	1	Dept. of Biology
L13	Protein and Lipid Sorting and Transport I: Endocytic and Secretion pathways. The Role of Endosomes. Biogenesis of Lysosomes and Lysosomal Proteolysis. Autophagy.	1	Dept. of Biology
L14	Protein and Lipid Sorting and Transport II: Protein Import into Mitochondria and Peroxisomes. Biogenesis and Function of Peroxisomes.	1	Dept. of Biology
L15	Biology of Reproduction: Meiosis.	1	Dept. of Biology
L16	Basics of Human Cytogenetics	1	Dept. of Biology
L17	Numerical Aberrations of Human Chromosomes	1	Dept. of Biology
L18	The Structure and Topological Organization of Chromatin	1	Dept. of Biology
L19	The Nuclear Envelope and Chromosome Territories	1	Dept. of Biology
L20	Nuclear Functional Domains: The Nuclear Bodies	1	Dept. of Biology
L21	Basic Genetic Mechanisms: DNA Replication	1	Dept. of Biology
L22	Molecular Basis of Gene Mutations	1	Dept. of Biology
L23	DNA Repair	1	Dept. of Biology
L24	Programmed Cell Death	1	Dept. of Biology
L25	Eukaryotic Gene Organization		Dept. of Biology
L26	The Relationship Between Chromatin Structure and Transcriptional Activity	1	Dept. of Biology
L27	Genome Organization in Prokaryotes and Eukaryotes. The Human Genome	1	Dept. of Biology
L28	Human Genome Variation and Pharmacogenetics	1	Dept. of Biology
L29	Regulation of Transcription I	1	Dept. of Biology
L30	Regulation of Transcription II	1	Dept. of Biology
L31	Posttranscriptional Control of Gene Expression	1	Dept. of Biology
L32	Translation of mRNA	1	Dept. of Biology
L33	Posttranslational Modifications of Proteins. Protein Degradation: Ubiquitin-Proteasome Pathway	1	Dept. of Biology
L34	Monogenic and Polygenic Human Disorders	1	Dept. of Biology
L35	Population Genetics	1	Dept. of Biology
L36	The Development and Causes of Cancer	1	Dept. of Biology
L37	Molecular Oncogenesis: Abnormal Cell Cycle in Malignancy I	1	Dept. of Biology
L38	Molecular Oncogenesis: Abnormal Cell Cycle in Malignancy II	1	Dept. of Biology
L39	Tools of Molecular Biology I	1	Dept. of Biology
L40	Tools of Molecular Biology II	1	Dept. of Biology

The list of seminars with descriptions:

	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	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	Human Fertilization and Early Embryonic Development	2	Dept. of Biology
S7	Mechanisms of Aneuploidy and Polyploidy	2	Dept. of Biology
S8	Human Chromosomal Rearrangements I	2	Dept. of Biology
S9	Human Chromosomal Rearrangements II	2	Dept. of Biology
S10	Problems: 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	

The list of practicals with descriptions:

	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	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

Students' obligations:

1. ATTENDANCE

Students are advised to attend all classes in order to avoid missing out on the material presented in class. In return the students can benefit from each other's contribution 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.

3. EXAMINATION

Exams and the final exam are obligatory. Midterm exams 1 and 2 are scheduled for the 2nd and 4th 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 and left the room.

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
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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) – 75-89.9%,

C (3) – 60 – 74.9%,

D (2) – 50 – 59.9%,

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 to 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 acknowledgement through quotation and citation.
6. Attempting to bribe or otherwise induce an instructor to alter either a grade or examination score

COURSE SCHEDULE (for academic year 2021/22)

1st week					
MONDAY	Oct. 4, 2021.	9:15-12:00	L1, L2, L4	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, practical room
		12:15-14:00	L5, L6	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
TUESDAY	Oct. 5, 2021	9:15-10:00	L7	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
		10:15-11:00	L3	Prof. Saša Ostojić, MD, PhD	Dept. of Biology, practical room
		11:15-12:00	L8	Prof. Saša Ostojić, MD, PhD	Dept. of Biology, practical room
		12:15-14:00	L9, L10	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, practical room
WEDNESDAY	Oct. 6, 2021	10:15-11:45	P1	Anita Barišić, MD, PhD	Dept. of Biology, practical room
		12:15-13:45	P2	Anita Barišić, MD, PhD	Dept. of Biology, practical room
		14:15-15:45	P3	Asst. Prof. Vraneković, PhD	Dept. of Biology, practical room
THURSDAY	Oct. 7, 2021	8:30-10:45	S1	Anita Barišić, MD, PhD	Dept. of Biology, library
		11:15-12:45	S2	Asst. Prof. Vraneković, PhD	Dept. of Biology, library
		13:15-14:45	S3	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
FRIDAY	Oct. 8, 2021	10:15-11:45	P4	Prof. Starčević Čizmarević, PhD	Dept. of Biology, practical room
		12:15-13:45	P5	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, practical room
2nd week					
MONDAY	Oct. 11, 2021	9:15-11:00	L11, L12	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, practical room
		11:15-12:45	L13, L14	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
		13:15-14:00	L15	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
TUESDAY	Oct. 12, 2021	10:15-12:00	L16, L17	Asst. Prof. Vraneković, PhD	Dept. of Biology, practical room
		12:15-15:00	L18- L20	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, practical room
WEDNESDAY	Oct. 13, 2021	09:15-10:45	S4	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, library
		11:15-12:45	P6	Asst. Prof. Vraneković, PhD	Dept. of Biology, practical room
		13:15-14:45	S5	Prof. Starčević Čizmarević, PhD	Dept. of Biology, practical room
THURSDAY	Oct. 14, 2021	9:15-10:45	S7	Asst. Prof. Vraneković, PhD	Dept. of Biology, library
		11:15-12:45	S6	Anita Barišić, MD, PhD	Dept. of Biology, library
		13:15-15:30	S8	Asst. Prof. Vraneković, PhD	Dept. of Biology, library

FRIDAY	Oct.15, 2021	8.15-9:15	1 st Midterm	Prof. Buretić-Tomljanović, PhD	online (Merlin, MS Teams)
		11:15-12:45	P7	Prof. Starčević Čizmarević, PhD	Dept. of Biology, practical room
		13:15-14:45	P8	Asst. Prof. Vraneković, PhD	Dept. of Biology, practical room
3rd week					
MONDAY	Oct.18, 2021	9:15-10:00	L21	Prof. Starčević Čizmarević, PhD	Dept. of Biology, practical room
		10:15-12:00	L22, L23	Asst.. Prof.Nina Pereza, MD, PhD	Dept. of Biology, practical room
		12:15-13:00	L24	Asst. Prof. Vraneković, PhD	Dept. of Biology, library
		13:15-14:00	L25	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, library
TUESDAY	Oct.19, 2021	9:15-10:00	L26	Asst. Prof. Vraneković, PhD	Dept. of Biology, library
		10:15-11:00	L27	Prof. Saša Ostojić, MD, PhD	Dept. of Biology, practical room
		11:15-12:00	L28	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, practical room
		12:15-14:00	L29, L30	Asst. Prof. Vraneković, PhD	Dept. of Biology, practical room
WEDNESDAY	Oct.20, 2021	8:30-10:45	S9	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
		11:15-12:45	S10	Anita Barišić, MD, PhD	Dept. of Biology, library
		13:15-14:45	P9 – MS Teams	Prof. Starčević Čizmarević, PhD	online (MS Teams)?
THURSDAY	Oct.21, 2021	10:15-11:45	P10	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, library
		12:15-15:00	L31 - L33	Asst. Prof. Vraneković, PhD	Dept. of Biology, library
FRIDAY	Oct.22, 2021	9:15-10:45	P11	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, library
		11:15-12:45	P12	Anita Barišić, MD, PhD	Dept. of Biology, practical room
4th week					
MONDAY	Oct.25, 2021	9:15-10:00	L34	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, practical room
		10:15-11:00	L35	Asst. Prof. Sanja Dević Pavlić, PhD	Dept. of Biology, practical room
		11:15-12:00	L36	Prof. Saša Ostojić, MD, PhD	Dept. of Biology, practical room
		12:15-14:00	L37, L38	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, practical room
TUESDAY	Oct 26, 2021	9:15-11:00	L39, L40	Prof. Starčević Čizmarević, PhD	Dept. of Biology, library
		11:15-12:45	P13	Anita Barišić, MD, PhD	Dept. of Biology, practical room
		13:45-16:00	S11	Prof. Buretić-Tomljanović, PhD	Dept. of Biology, practical room

WEDNESDAY	Oct 27, 2021	10:15-11:45	S12	Anita Barišić, MD, PhD	Dept. of Biology, library
		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, library
		15:45-17:15	P14	Anita Barišić, MD, PhD	Dept. of Biology, library
THURSDAY	Oct 28, 2021	10:15-11:15	2nd Midterm Exam		online (Merlin, MS Teams)
FRIDAY	Oct 29, 2021		FINAL EXAM		online/onsite

List of lectures and seminars:

	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	Transport of Macromolecules: Endocytosis and Exocytosis.	1	Dept. of Biology
L8	Bioenergetics	1	Dept. of Biology
L9	Cytoskeleton and Cell Movement	1	Dept. of Biology
L10	The Extracellular Matrix and Cell-Cell Interactions	1	Dept. of Biology
L11	Regulation of the Cell Cycle	1	Dept. of Biology
L12	The Basics of Cell Signaling	1	Dept. of Biology
L13	Protein and Lipid Sorting and Transport I: Endocytic and Secretion pathways. The Role of Endosomes. Biogenesis of Lysosomes and Lysosomal Proteolysis. Autophagy.	1	Dept. of Biology
L14	Protein and Lipid Sorting and Transport II: Protein Import into Mitochondria and Peroxisomes. Biogenesis and Function of Peroxisomes.	1	Dept. of Biology
L15	Biology of Reproduction: Meiosis.	1	Dept. of Biology
L16	Basics of Human Cytogenetics	1	Dept. of Biology
L17	Numerical Aberrations of Human Chromosomes	1	Dept. of Biology
L18	The Structure and Topological Organization of Chromatin	1	Dept. of Biology
L19	The Nuclear Envelope and Chromosome Territories	1	Dept. of Biology
L20	Nuclear Functional Domains: The Nuclear Bodies	1	Dept. of Biology
L21	Basic Genetic Mechanisms: DNA Replication	1	Dept. of Biology

L22	Molecular Basis of Gene Mutations	1	Dept. of Biology
L23	DNA Repair	1	Dept. of Biology
L24	Programmed Cell Death	1	Dept. of Biology
L25	Eukaryotic Gene Organization		Dept. of Biology
L26	The Relationship Between Chromatin Structure and Transcriptional Activity	1	Dept. of Biology
L27	Genome Organization in Prokaryotes and Eukaryotes. The Human Genome	1	Dept. of Biology
L28	Human Genome Variation and Pharmacogenetics	1	Dept. of Biology
L29	Regulation of Transcription I	1	Dept. of Biology
L30	Regulation of Transcription II	1	Dept. of Biology
L31	Posttranscriptional Control of Gene Expression	1	Dept. of Biology
L32	Translation of mRNA	1	Dept. of Biology
L33	Posttranslational Modifications of Proteins. Protein Degradation: Ubiquitin-Proteasome Pathway.	1	Dept. of Biology
L34	Monogenic and Polygenic Human Disorders	1	Dept. of Biology
L35	Population Genetics	1	Dept. of Biology
L36	The Development and Causes of Cancer	1	Dept. of Biology
L37	Molecular Oncogenesis: Abnormal Cell Cycle in Malignancy I	1	Dept. of Biology
L38	Molecular Oncogenesis: Abnormal Cell Cycle in Malignancy II	1	Dept. of Biology
L39	Tools of Molecular Biology I	1	Dept. of Biology
L40	Tools of Molecular Biology II	1	Dept. of Biology
Total:		40	

	Seminars (Topics)	Teaching Hours	Lecture Room
S1	Cell chemistry. Three Domains of Life. Prokaryotic and Eukaryotic Cells.	3	Dept. of Biology
S2	Transport of Small Molecules	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	Human Fertilization and Early Embryonic Development	2	Dept. of Biology
S7	Mechanisms of Aneuploidy and Polyploidy	2	Dept. of Biology
S8	Human Chromosomal Rearrangements I	3	Dept. of Biology
S9	Human Chromosomal Rearrangements II	3	Dept. of Biology
S10	Problems: Mendelian and Non-Mendelian Inheritance	2	Dept. of Biology
S11	Genetic Abnormalities of Orofacial Structures	3	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
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	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	

	FINAL EXAM DATES
1.	October 29 th , 2021
2.	February 9 th , 2022
3.	February 23 rd , 2022
4.	June 29 th , 2022
5.	September 7 th , 2022