DISCIPLINE SHEET

ACADEMIC YEAR

2024 - 2025

1. DATA ABOUT THE STUDY PROGRAM

1.1 Institution of higher education	UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA
1.2 Faculty	**MEDICINE**
1.3 Department	**1**
1.4 Study Domain	HEALTH
1.5 Study cycle	LICENCE
1.6 Study program/ Qualification	Medicine

2. DATA ABOUT THE DISCIPLINE

2.1 DISCIPLINE NAME				**MOLECULAR AND CELLULAR BIOLOGY**	
2.2. Discipline code				**MED1105**	
2.3 The holder of course activities				Ioana Streață/ Anca Costache	
2.4 The holder of seminar activities				Ioana Streață / Anca Costache / Răzvan Pleşea	
2.5. Academic degree				Assoc. Professor / Lecturer/Assist. Professor	
2.6. Employment (base norm/associate)				Base Norm / Associate	
2.7. Year of study	**I**	2.8. Semester	**II**	2.9. Course type (content) 2.10. Regime of discipline (compulsoriness)	**CFD**

3. TOTAL ESTIMATED TIME (teaching hours per semester)

3.1 Number of hours per week	**5**	3.2 From which - course	**2**	3.3 seminary/laboratory	**3**
3.4 Total hours in curriculum	**70**	3.5 From which - course	**28**	3.6 seminary/laboratory	**42**
Time found distribution (hours)					
Study by manual, course support, bibliography, and notes					**10**
Additional documentation in the library, specialized electronic platforms and, on the field					**23**
Training seminars / labs, homework, reports, portfolios, and essays					**10**
Tutoring					**12**
Examinations					**10**
Other activities, counselling, student circles					**15**

3.7 Total hours of individual study	**80**
3.9 Total hours per semester	**150**
3.10 Number of credits)	**6**

4. PREREQUISITES (where appropriate)

4.1 curriculum	The students must have good knowledge of anatomy, physiology, biochemistry and biophysics
4.2 competency	-

5. CONDITIONS (where appropriate)

5.1. of course deployment	Lecture Hall with projector / online
5.2. of seminary/ lab deployment	Physiology Lab / online.

6. SPECIFIC COMPETENCES ACCRUED

PROFESSIONAL COMPETENCES	**C1.** Recognize the molecular mechanisms involved in pathological processes. **C4.** To address health problems / illness from the perspective of community features, directly related to the social, economic and / or that their cultural community. **C5.** To initiate and conduct scientific research and / or format field of competence

TRANSVERSAL COMPETENCES	**CT1.** Autonomy and responsibility: • acquisition of moral guidelines, training of professional and civic attitudes that enable students to be fair, honest, non-confrontational, cooperative and understanding in the face of suffering, available to help people interested in the developer community; • to know, respect and contribute to the development of moral values and professional ethics; • learn to recognize when a problem arises and provide responsible solutions to solve them. **CT2.** Social interaction: • recognize and have respect for diversity and multiculturalism; • have or learn to develop teamwork skills; • communicate orally and in writing requirements, working methods, results, consult with the team; • get involved in volunteering, to know the essential problems of the community. **CT3.** Professional and personal development: • appreciate the need for individual study as the basis of personal autonomy and professional development; • to exploit their potential to the optimum and creative collective activities; • know how to use information and communication technology.

7. DISCIPLINE OBJECTIVES (based on the grid of specific competences acquired)

7.1 The general objective of the discipline	The objective of Cellular and Molecular Biology Course is to provide students in the Ist year, informational and logistical support necessary to acquire knowledge on general concepts about cells, the molecular basis of cellular organization (structure and ultrastructure of eukaryotic cells) and cellular mechanisms of physiological and pathological.
7.2 The specific objectives of the discipline	On completion of training in this discipline the student will be familiar with the concepts and techniques of modern molecular and cellular biology: light and electron microscopy, cell culture, cell fractionation methods, spectrophotometry, RNA-DNA technology (PCR, Sequencing, Real-Time PCR), and can integrate knowledge of Cell Biology and Molecular notions gained from other disciplines. Thus, by following the discipline program, the student will be able to acquire: **COGNITIVE SKILLS** that will allow them: • to integrate theoretical and practical knowledge gained from molecular and cellular biology discipline with those obtained from other disciplines fundamentals and use them as a platform for clinical training; • communicate clearly, rigorous knowledge gained and the results obtained; • to issue hypotheses and verify them by experimenting. **PRACTICAL SKILLS**: • organize the application of practical work: to form a team, share tasks, collaborate, communicate requirements, prepare materials, pursue a given protocol, record the results, communicating results, discuss them as a team; • use teaching materials and equipment specified in Cellular and Molecular Biology Laboratory; • using optical microscopy; • recognize electronic microscopy images; • isolate and evaluate nucleic acids to interpret PCR results, Real-Time PCR, ASO, RFLP, sequencing; • to interpret agarose gel electrophoresis and polyacrylamide gel for DNA samples. **ATITUDE:** • to know, respect and contribute to the development of moral values and professional ethics; • recognize and have respect for diversity and multiculturalism; • have or learn to develop teamwork skills; • communicate orally and in writing requirements, working methods, results, consult with the team; • get involved in volunteering, to know the essential problems of the community. • to exploit their potential to the optimum and creative collective activities; • know how to use information and communication technology; • have initiative to engage in educational activities and scientific discipline.

8. CONTENTS

8.1 Course **(content units)**	hours
CB01. Introduction to the Cell. Cells and Genomes. The Universal Features of Cells on Earth. The Chemical Components of a Cell. The Diversity of Genomes and the Tree of Life. Genetic Information in Eucaryotes. The Shape and Structure of Proteins Protein Function.	**2**
CB02. Internal Organization of the Cell. Membrane Structure. The Lipid Bilayer. Membrane Proteins.	**2**

CB03. DNA and Chromosomes. The Structure and Function of DNA. Chromosomal DNA and Its Packaging in the Chromatin Fiber. The Global Structure of Chromosomes	**2**
CB04. DNA Replication, Repair, and Recombination. The Maintenance of DNA Sequences	**2**
CB05. How Cells Read the Genome: From DNA to Protein. From DNA to RNA. From RNA to Protein. The RNA World and the Origins of Life	**2**
CB06. Control of Gene Expression. An Overview of Gene Control. DNA-Binding Motifs in Gene Regulatory Proteins. Posttranscriptional Controls	**2**
CB07. Membrane Transport of Small Molecules. Principles of Membrane Transport. Carrier Proteins and Active Membrane Transport. Ion Channels and the Electrical Properties of Membranes	**2**
CB08. Cell Junctions, Cell Adhesion, and the Extracellular Matrix.	**2**
CB09. The Cytoskeleton. The Self-Assembly and Dynamic Structure of Cytoskeletal Filaments. How Cells Regulate Their Cytoskeletal Filaments. Molecular Motors. The Cytoskeleton and Cell Behavior	**2**
CB10. Intracellular Compartments and Protein Sorting. The Compartmentalization of Cells. The Transport of Molecules between the Nucleus and the Cytosol. The Transport of Proteins into Mitochondria and Chloroplasts. Peroxisomes. The Endoplasmic Reticulum	**2**
CB11. Intracellular Vesicular Traffic. The Molecular Mechanisms of Membrane Transport and the Maintenance of Compartmental Diversity. Transport from the ER through the Golgi Apparatus. Transport from the Trans Golgi Network to Lysosome. Endocytosis. Exocytosis	**2**
CB12. Cell Communication. General Principles of Cell Communication. Signaling through G-Protein-Linked Cell-Surface Receptors. Signaling through Enzyme-Linked Cell-Surface Receptors. Signaling Pathways That Depend on Regulated Proteolysis	**2**
CB13. Energy Conversion: Mitochondria. The Mitochondrion. Electron-Transport Chains and Their Proton Pumps	**2**
CB14. The Cell-Division Cycle. The General Strategy of the Cell Cycle. An ofverwiew of M Phase. Mitosis. Cytokinesis	**2**
BIBLIOGRAPHY **1. Molecular Biology of the Cell Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, and Peter Walter. Garland Science; 2015. http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=mboc4.TOC&depth=2** **2. Lectures** **3. Link: Lectures – Cell and Molecular Biology: http://suportcursonline.umfcv.ro/CursuriOnline/Medicina/AN%201/BIOLOGIE%20CELULARA%20SI%20MOLECULARA/** **4. Harvey Lodish, Arnold Berk, et al. *Molecular Cell Biology, 8th edition.* New York: W. H. Freeman; 2016; http://www.ncbi.nlm.nih.gov/books/NBK21475/**	
8.2 Practical work (topics / themes)	hours
LB01. Principles of Cell and Molecular Biology used in diagnosis and medical research	**3**
LB02. Structural and morphological evaluation of the cell by optical and electronic microscopy techniques	**3**
LB03. Cell cycle and control of cellular activities. Cell cultures	**3**
LB04. The study of cellular organelles. Methods of cell fractionation	**3**
LB05. DNA & RNA isolation and purification methods	**3**
LB06. Polymerase chain reaction I. Types of PCR methods, applications, and optimization.	**3**
LB07. Polymerase chain reaction II. Types of PCR methods, applications and optimization.	**3**
LB08. Classical electrophoretic techniques used to separate purify and analyze macromolecules. Applications - evaluation of genomic DNA and amplicons - Restriction Fragment Length Polymorphism (RFLP)	**3**
LB09. Modern electrophoretic techniques. Capillary gel electrophoresis. Applications: DNA fragment analysis (QF-PCR; MLPA).	**3**
LB10. DNA sequence analysis techniques. Capillary sequencing. Next Generation Sequencing methods I.	**3**
LB11. DNA sequence analysis techniques. Capillary sequencing. Next Generation Sequencing methods II.	**3**
LB12. Detection and quantification of RNA molecules (gene expression assessment).	**3**
LB13. Hybridization techniques (REAL-TIME PCR). Techniques for analysis of fragments at genomic scale (array-CGH, SNP-array).	**3**
LB14. Labs Overview	**3**
BIBLIOGRAPHY **1. Discipline protocols** **2. Molecular Biology of the Cell Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, and Peter Walter. Garland Science; 2015. http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=mboc4.TOC&depth=2** ***3. Link: Lectures – Cell and Molecular Biology: http://suportcursonline.umfcv.ro/CursuriOnline/Medicina/AN%201/BIOLOGIE%20CELULARA%20SI%20MOLECULARA/*** ***4. Harvey Lodish, Arnold Berk, et al. Molecular Cell Biology, 8th edition. New York: W. H. Freeman; 2016; http://www.ncbi.nlm.nih.gov/books/NBK21475/***	

9. CORROBORATING THE DISCIPLINE CONTENT WITH THE EXPECTATIONS OF EPISTEMIC COMMUNITY REPRESENTATIVES, PROFESSIONAL ASSOCIATIONS AND EMPLOYEE REPRESENTATIVES RELATING TO THIS PROGRAM

- Cell and Molecular Biology is a fundamental discipline, mandatory for a student in his preparation for becoming a doctor.
- The knowledges, practical skills and the attitudes learned on this discipline are offering the basics of the pathological processes that will be studied in other disciplines and it is the basis for comprehension and understanding and learning of every medical attitude regarding the prevention, diagnosis, curative and the recovery processes.

10. MHETODOLOGICAL LANDMARKS

Types of activity	Techniques of teaching / learning, materials, resources: lecture, interactive group work, learning based problems / projects audio-video recordings, etc.
Course	In case of special situations (alert states, emergency states, other types of situations that limit the physical presence of people) the activity can be carried out online using computer platforms approved by the faculty / university. The online education process will be adapted accordingly to ensure the fulfilment of all the objectives set out in the discipline sheet.
Practical work	The following combined methods are used: lecture, debate, problematization.
Individual study	For the online version: lecture, debate, problematization based on materials provided in advance.

11. RECOVERY PROGRAM

	No. absences that can recover	**Place of deployment**	**Period**	**In charge**	**Scheduling of topics**
Absences recoveries	3	Molecular and cellular biology laboratory	Final week of the semester	Teaching Assistant	According to the internal schedule
Schedule consultations / Students' Scientific Circle	2 hours / week / teacher	Molecular and cellular biology laboratory	Every week	All teaching assistants	The theme of the week.
Program for students poorly trained	2 hours / week	Molecular and cellular biology laboratory	Every week	All teaching assistants	According to the situation of each student Theme from that specific week

12. ASSESMENT

Activity	**Types of assessment**	**Methods of evaluation**	**Percentage from final grade**
Lecture	Formative assessment through essays, projects and surveys during the semester Summative assessment during the exam	Multiple Choice Questions Answering System (MCQ)/MCQ with the help of the IT platform in the online version.	**60%**
Practical work	Formative assessment through Multiple Choice Questions Answering System (MCQ) or/and descriptive, projects, survey during the semester. Periodic assessment during the semester Summative assessment during the exam	Multiple Choice Questions Answering System (MCQ) simultaneously with the one from the course / with the help of the video platform in the online version.	**20%**
Periodic assessment			10%
Assessment of individual activity			10%
Minimum performance standard	At least 50% for each component of the evaluation		

13. GUIDANCE AND COUNSELLING PROGRAMS

Professional guidance and counselling programs (2 hours/monthly)		
Scheduling the hours	**Place of deployment**	**In charge**
Last Thursday of each month, 12-14	Molecular and cellular biology laboratory	All the members of the teaching team

Endorsement date in the department: 23.09.2024

Department Director,	**Coordinator of study program,**	**Discipline holder,**
Prof. Ion MÎNDRILĂ	**Prof. Marius Eugen CIUREA**	**Assoc. Prof. Ioana STREAȚĂ**