**ACADEMIC DISCIPLINE OVERVIEW**

1. **Program data**

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| 1.1. Higher education institution | Grigore T. Popa University of Medicine and Pharmacy Iasi |
| 1.2. Faculty | Medical Bioengineering |
| 1.3. Department | Biomedical Sciences |
| 1.4. Field of study | Health |
| 1.5. The cycle of studies | Bachelor |
| 1.6. Study program / qualification | Balneo-physiokinetotherapy and rehabilitation – english language / Physiokinetotherapist |

**2. Discipline data**

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| 2.1. Name of the discipline / Code | | | | **Cell and Molecular Biology** | | **RE1123** |
| 2.2. Teaching staff in charge with lectures | | | | **Associate Professor Maria Butnaru, PhD** | | |
| 2.3. Teaching staff in charge with practical activities | | | | **Assistant Professor Andreea Luca, PhD** | | |
| 2.4. Year of study | **I** | 2.5. Semester | **1** | 2.6. The type of assessment | **Colloquium, C1** | |
| 2.7. Discipline type | | **Elective** | | **Fundamental discipline** | | |

**3. Estimated total time (hours/semester of didactic activity)**

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| 3.1. Number of hours / week: | | 3.2. Courses number of hours / week | | 3.3. Seminars / practical classes  number of hours / week | | | |
| Semester 1 | **1** | **0,5** | | **0,5** | | | |
| Semester 2 |  |  | |  | | | |
| 3.4. Total number of learning hours: | **14** | 3.5. Of which: Courses | **7** | 3.6. Of which: Seminars / practical classes: | | | **7** |
| 3.7. Distribution of individual study time: | | | | | Hours sem. 1 | Hours sem. 2 | |
| Study time using course book materials, bibliography and hand notes | | | | | 15 |  | |
| Supplementary documentation in the library, using specialised platforms via internet and by field work | | | | | 10 |  | |
| Preparation time for seminars / practical classes, study themes, reviews, portfolio and essays | | | | | 6 |  | |
| Tutorship | | | | | 2 |  | |
| Examinations | | | | | 2 |  | |
| Other activities | | | | | 5 |  | |
| Total hours of individual study (*without examinations*) | | | | | **36** |  | |
| 3.8. Total hours per semester | | | | | **50** |  | |
| 3.9. Number of credits | | | | | **2** |  | |

**4. Preconditions (where applicable)**

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| 4.1. of curriculum | Not necessary |
| 4.2. of competences | Not necessary |

5. **Conditions (where applicable)**

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| 5.1. for lectures | PowerPoint presentation facilities |
| 5.2. for seminars / practical classes | Microscopy laboratory |

**6. Specific competences acquired**

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| **Professional competencies** | **C1.1** | The ability to describe the concepts and theories about the fundamental mechanisms of functioning of the human body through its cells and tissues. |
| **C1.2** | The ability to formulate the assumptions and to use the key concepts to explain diseases |

7**.** **Objectives of the study discipline (according to the grid of specific competences acquired)**

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| 7.1. General objective | The aims of the course are to broaden the knowledge regarding the living matter through the relationship of the cell structure with its function. |
| 7.2. Specific objectives | - Knowledge of the prokaryotic and eukaryotic cell structure and cell functions  - Knowledge of the molecular mechanisms underlying cellular functions;  - Learning techniques for study of the living matter at different structural levels |

**8. Contents**

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| **8.1. Lectures** | | **Teaching methods** | **Observations** |
| 1 | **Theories on the first forms of life**. Ancestral cells. The structure of the eukaryotic cells. The origin of eukaryotic cells. The main classes of cell macromolecules. | Interactive course presentation, using PowerPoint slides | 1 hour |
| 2 | **Molecular structure of cell membranes**. Chemical composition of the cell membranes. Cell membrane differences between cells. The properties and functions of the cell membranes. | Interactive course presentation, using PowerPoint slides | 2 hours |
| 3 | **Cytoplasm**. Chemical composition and functions. Cell organels involved in cell syntesis proceses. Cell organels for energy syntesis. Cell death by apoptosis. Biological relevance of apoptosis | Interactive course presentation, using PowerPoint slides | 2 hours |
| 4 | **Cell nucleus**. Nucleic acids structure. The condensation levels of the nuclear chromatin. Molecular basis of DNA recombination and transcription. Gene expression. Cell division: mitosis and meiosis. Gene regulation | Interactive course presentation, using PowerPoint slides | 2 hours |

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| **8.2. Practical activities - practical class** | | **Teaching methods** | **Observations** |
| 1 | Good laboratory practice rules. Rules on chemical and biological waste collection. Presentation of the main methods for cellular observation. Optical microscopy (bright field, fluorescence, polarized and phase contrast microscopy) | Practical prezentation and hands on avtivity | 2 hours |
| 2 | Morphological study of the cells. The shape and size of the cells. Comparative study of animal cells. Observation of the cell organelles. Identification, localization and characterization of the cell organelles. | Practical prezentation and hands on avtivity using microscop slides | 2 hours |
| 3 | The preparation, staining and analysis of the cell monolayers from fresh tissue | Practical prezentation and hands on avtivity using microscop slides | 2 hours |
| 4 | Practical evaluatin | Evaluation of the practical abilities and knowlege | 1 hour |

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| **8.3. Bibliography:** |
| ***Mandatory:*** |
| 1. Harvey Lodish. Molecular Cell Biology, 9th Ed, 2021 2. **Maria Butnaru**, Andreea Luca. *Cultura de celule animale: Tehnici uzuale si tehnici speciale*. Editura PIM, Iasi, 2014 |
|  |
| ***Elective:*** |
| Methods in Cell Biology. Ed. Phong Tran, 2020  1. Drobota, Mioara; Butnaru, Maria; Aflori, Magdalena Tailoring Protein-Based Materials for Regenerative Medicine and Tissue Engineering, INTELLIGENT POLYMERS FOR NANOMEDICINE AND BIOTECHNOLOGIES, 1ST EDITION Pages: 191-207 Published: 2018 |

**9. *Correlation of the discipline contents with the expectations of the epistemic community, professional associations, and representative employers from the afferent program field***

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| Knowledge and abilities are established as didactic objectives and specified as such in the analytic programs that are revised yearly. After their analysis by the study discipline staff, these are discussed and approved in the Curricular Committee, towards curricular harmonization among the various study disciplines. Along this entire process systematic evaluation is performed, directly if possible, regarding the correspondence of the contents to the expectations of the academic community and of the representatives of the social community, professional associations, and employers. |

**10. Evaluation**

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| Type of activity | Assessment criteria | Evaluation methods | Contribution to the final grade |
| Lectures | Acquiring theoretical notions and presented in the course | Written exam.  MCQ Examination | 80 % |
| Practical activities | Activities carried out in laboratory and conducted quality essays. | Colloquium practical activity | Admitted/ Rejected |
| Individual study | Preparation time for seminars / practical classes, study themes, reviews, portfolio and essays.  Individual study using coursebook materials, bibliography and hand notes, documentation in the library, using specialised platforms via internet and by field work. | Tests during the semester | 20 % |
| Minimal performance standard:  • Knowledge of the structural elements of cells and their basic functions (proved in the theoretical examination)  • The ability to evaluate biological preparations using the optical microscope | | | |

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| Date | Holder of course / signature, | Holder of practical activities / signature, |
| 7.09.2024 | Associate Professor Maria Butnaru, PhD | Assistant Professor Andreea Luca, PhD |

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| Date of approval in the Department Council/Teaching Council, | | |
| 19.09.2024 |  | Department director / signature, |
|  |  | Associate Professor Daniela-Viorelia Matei, MD, PhD |