**ACADEMIC DISCIPLINE OVERVIEW**

1. **Program data**

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| **1.1.** | **GRIGORE T. POPA UNIVERSITY OF MEDICINE AND PHARMACY IASI** | | | | | | | |
| **1.2.** | **FACULTY OF MEDICAL BIOENGINEERING** | | | | | | | |
| **1.3.** | **PROGRAMME:** Physio-kinetotherapy and rehabilitation | | | | | | | |
| **1.4.** | **STUDY FIELD:** Health | | | | | | | |
| **1.5.** | **STUDY CYCLE**: UNDERGRADUATE | | | | | | | |
| **1.6.** | **STUDY PROGRAMME:** INENGLISH | | | | | | | |
| 1. **Subject data** | | | | | | | | |
| **2.1.** | **Subject: Cell and Molecular Biology** | | | | | | | |
| **2.2.** | **Module leader: Associate Professor Ph.D. Maria Butnaru** | | | | | | | |
| **2.3.** | **Seminar leader: Associate Professor Ph.D. Maria Butnaru** | | | | | | | |
| **2.4. Year of study** | | **I** | **2.5. Semester in which is taught** | **I** | **2.6. Evaluation type** | C | **2.7. Subject status** | Elective  DF |

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

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| **3.1.Number of hours / week** | 2 | **3.2. Courses number of hours / week** | 1 | **3.3.Seminar / l practical classes** | 1 |
| **3.4. Total number of learning hours** | 28 | **3.5. Courses** | 14 | **3.6. Seminar / practical classes** | 14 |
| **3.7. Distribution of the available time** | | | | | Hours |
| **Study based on the manual, lecture support, bibliography and hand notes** | | | | | 14 |
| **Supplementary documentation in the library, using specialised platforms via internet and by field work** | | | | | 6 |
| **Preparation for seminars / practical classes, study themes, reviews, portofolio, and essays** | | | | | 2 |
| **Tutorship** | | | | | 2 |
| **Examinations** | | | | | 2 |
| **Other activities** | | | | |  |
| **3.8. Total hours of individual study** | | | | | 22 |
| **3.9. Total hours per semester** | | | | | 50 |
| **3.10. Number of credits** | | | | | 2 |

1. **Preconditions (where applicable)**

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

1. **Conditions (where applicable)**

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| **5.1.** for lectures | PowerPoint presentation facilities |
| **5.2.** for seminars / practical classes | Optical microscopes. Glassware, materials, reagents, equipment and specific instruments, used in the cell biology laboratory  Students will wear protective clothing (lab coat, disposable gloves). |

1. **Specific competences acquired**

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| Professional competences (expressed as knowledge and abilities) | C.1.1 The ability to describe the concepts and theories about the fundamental mechanisms of functioning of the human body through its cells and tissues.  C.1.2. The ability to formulate the assumptions and to use the key concepts to explain diseases |
| Transverse competences (of role, of professional development, personal) | CT.1 Ability to Identify objectives to be achieved, the resources available, the conditions to completion to their work flow, working time, deadlines and related risks  CT.2. The ability to form work teams to solve complex practical activities and development of interdisciplinary scientific studies.  CT.3. Effective use of the information sources and the communication resources (Internet portals, specialized data bases, online courses, etc.) both in Romanian and in a foreign language |

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

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| **7.1.** General objective | The course aims is to broaden the knowledge regarding the living matter through the relationship of cell structure with its function. |
| **7.2.** Specific objectives | - Knowledge of the structure and functions of prokaryotic and eukaryotic cells;  - Knowledge of the molecular mechanisms underlying cellular functions;  - Learning techniques for study of the living matter at different structural levels  - Training the skills transposing theoretical concepts in practical activity;  - Training the skills to exploit the knowledge in an interdisciplinary context |

1. **Contents**

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| **8.1. Lecture** | | **Teaching methods** | **Observations** |
| Theories on the first forms of life. Ancestral cells. The structure of the eukaryotic cells. The origin of eukaryotic cells. The chemical composition of cells. The main classes of cell molecules. Proteins structure. | | Interactive course presentation, using PowerPoint slides | 2 hour |
| Molecular structure of cell membranes. Chemical composition of the plasmalema and other cell membranes. Cell membrane differences between cells. The properties and functions of the cell membranes. Membrane transport and cell signalling. Membrane disorders that lead to diseases | | Interactive course presentation, using PowerPoint slides | 2 hours |
| Cytoskeleton. Cytoskeleton functions. Cell-extracellular matrix relationship. | | Interactive course presentation, using PowerPoint slides | 2 hour |
| Cell nucleus. The condensation of the chromatin and the condensation levels. Nucleic acids structure. DNA recombination and transcription. | | Interactive course presentation, using PowerPoint slides | 2 hour |
| Mitosis and Meiosis. Molecular mechanisms of DNA replication and transcription. Gene expression. Gene regulation | |  |  |
| Cytoplasm. Cytoplasm composition. Cell organelles. Functional organization of the cell organelles. Their role in cells and implication in some pathology statuses. Ribosomes and rough and smooth endoplasmic reticulum. Structure and functions. | | Interactive course presentation, using PowerPoint slides | 2 hours |
| Golgi apparatus and transport vesicles. Structure and functions. Lysosomes formation and functions. Peroxisomes, their role in cell anti-oxidative defense. | | Interactive course presentation, using PowerPoint slides | 2 hours |
| Mitochondria, energy synthesis and apoptosis. | | Interactive course presentation, using PowerPoint slides | 2 hours |
| **Bibliography**   1. Harvey Lodish. Molecular Cell Biology, 8th Ed, W. H. Freeman and Company, 2016 2. William Klug, Michael Cummings, Charlotte Spencer, Michael Palladino. **Essentials of Genetics**, 7th Edition, 2010 | | | |
| **8.2. Seminar / practical classes** | **Teaching methods** | | **Observations** |
| Good laboratory practice rules. Rules on chemical and biological waste collection. Presentation of the main methods for cellular observation. | Work safety training, presentation of the laboratory equipment. | | 2 hour |
| Optical microscopy (bright field, fluorescence, polarized and phase contrast microscopy) | Learning to work with the bright field microscope and other auxiliary devices | | 2 hour |
| Morphological study of the cells. The shape and size of the cells. Comparative study of animal and vegetal cells. | Microscopic analysis of the permanent microscopic slides with animal and vegetal tissues. | | 2 hours |
| Observation of the cell organelles. Identification, localization and characterization | Microscopic analysis of the permanent microscopic slides with organelles specific staining and the electron-microscopy images | | 2 hours |
| Morphological study of the nucleus in interphase and cell divizion. The shape, number and location of the cell nucleus. Highlighting the nuclear chromatin and nucleoli. | Bright-field microscopic analysis of the permanent microscopic slides and the electron-microscopy images. Final conclusions. | | 2 hours |
| The preparation, staining and analysis of the cell monolayers | Monolayer preparation, staining and microscopic analysis | | 2 hours |
| Cell culture method. Principle of the method, special conditions and working techniques. | Learning of work protocols and practical demonstrations. | | 2 hours |
| **Bibliography**   1. Bruce Alberts: **Molecular Biology of the Cell**. 6th edition, 2014 | | | |

1. **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. |

1. **Evaluation**

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| **Type of activity** | **Type of activity** | **Evaluation methods** | **Contribution to the final grade** |
| **Lecture** | Acquiring the concepts and theoretical information presented in the course | Written exam | 50% |
| **Seminar/practical classes** | Theme for practical works | Evaluation during semester | 10% |
| The note of the practical examination | Practical exam | 40% |
| **Minimal performance standard: Minimum passing condition is mark 5. Ability to work with bright-field microscopes and ability to identify the different compounds of the cell.** | | | |

**Date of completion: Signature of head of discipline**

Associate Professor Ph.D. Maria Butnaru

25.09.2019

**Department approval date**

30.09. 2019 **Signature of department director:**

Lecturer Matei Daniela-Viorelia