**SYLLABUS**

1. **Programme Details**

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| **1.1.** | **GRIGORE T. POPA UNIVERSITY OF MEDICINE AND PHARMACY IASI** | | | | | | | |
| **1.2.** | **FACULTY : MEDICINE / DEPARTMENT: MORPHO-FUNCTIONAL II** | | | | | | | |
| **1.3.** | **DISCIPLINE: PHYSIOLOGY** | | | | | | | |
| **1.4.** | **FIELD of STUDY: HEALTH** | | | | | | | |
| **1.5.** | **STUDY CYCLE: BACHELOR** | | | | | | | |
| **1.6.** | **PROGRAMME of STUDY: MEDICINE-ENGLISH** | | | | | | | |
| 1. **Discipline Details** | | | | | | | | |
| **2.1.** | **Name of the Discipline: PHYSIOLOGY** | | | | | | | |
| **2.2.** | **Teaching staff in charge with lectures:** Prof. Dr. Serban Dragomir Nicolae | | | | | | | |
| **2.3.** | **Teaching staff in charge with seminar activities:** Assist. Prof. Popescu Ionut Raducu, Assist. Dr. Pohaci-Antonesei Cătălin; Res. Assist. Forna Norin | | | | | | | |
| **2.4. Year** | | **I** | **2.5. Semester** | **I/II** | **2.6. Type of evaluation** | E1/E2 | **2.7. Discipline regimen** | Compulsory |

1. **Overall Time Estimates (hours/semester of didactic activity)**

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| * 1. **Number of hours per week** | 6 | **Of which: 3.2. lectures** | | 3 | * 1. **seminar/ laboratory** | 3 |
| * 1. **Total hours in the curriculum** | 84 | **Of which: 3.5. lectures** | | 42 | **3.6. seminar/ laboratory** | 42 |
| **Distribution of time** |  |  | |  |  | Hours |
| **Study time using coursebook materials, bibliography and notes** | | | | | | 20 |
| **Further study time in the libray, online and in the field** | | | | | | 20 |
| **Preparation time for seminars / laboratories, homework, reports, portfolios and essays** | | | | | | 20 |
| **Tutoring** | | | | | | 2 |
| **Examinations** | | | | | | 4 |
| **Other activities** | | | | | |  |
| **3.7. Total hours of individual study** | | |  | | | 66 |
| **3.8. Total hours / semester** | | |  | | | 150 |
| **3.9. Number of credits** | | |  | | | 6 |

1. **Prerequisites (where applicable)**

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

1. **Conditions (where applicable)**

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| **5.1. for lecture delivery** | Lecture hall, equipped with whiteboard and laptop, videoprojector and suitable software – Power Point |
| **5.2. for seminar / laboratory delivery** | Seminar room, equipped with whiteboard and laptop, videoprojector and suitable software – Power Point |

1. **Specific Competences Acquired**

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| **Professional Competences (knowledge and skills)** | 1. Ergometry and muscle fatigue  2. Haematocrit determination  3. Erythrocytes sedimentation rate determination  4. Red blood cell count  5. Methods of blood detection  6. Derived RBC indices  7. Haemoglobin determination by Gowers-Sahli method  8. Blood typing systems determination: ABO and Rh systems  9. White cell blood count. Differential white blood cell count (leucocytes formula)  10. Platelets count  11. Bleeding time determination  12. Coagulation time determination.  13. Prothrombin time determination.  14. Measurement of the gastric juice acidity and secretory flows.  15. Biliary pigments detection  16. Pancreatic amylase assessment |
| **Transversal Competences (roles, personal and professional development)** | * team work * bases for the integrative approach regarding knowledge and abilities |

1. **Obiectives of the Discipline (related to the acquired competences)**

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| **7.1. General Obiective** | The students will gain knowledge about the normal functions of the body and will be able to understand into an integrative manner physiological processes, from cell to organism, thus gaining a solid foundation for clinical medical sciences. |
| **7.2. Specific Obiectives** | - theoretical training of the students in order to assimilate knowledge through systematic information on functional integration phenomena from cell to organism  - presentation of some theoretical concepts during the practical classes by classic experiments (video) and various computer simulations (mostly interactive);  - acquiring the practical skills by the students on proper execution of some maneuvers, based on accurate procedures and understanding the issues explored;  - education of medical students in the spirit of the accurateness of the medical act, and the understanding of the basic science crucial role for its level and for their professional training. |

1. **Contents**

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| **8.1. Lecture** | | **Teaching methods** | **Comments** |
| 1. Structural and functional organization of living matter from molecule to organism; functional systems of the organism. Fundamental properties of living matter. Principles of functional integration (adjustment mechanisms, signalling and control concepts in physiology). Functional involvement of chemical elements. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 2. Functional systems of the cell. Membrane transport mechanisms. Excitability and conductibility. Resting membrane potential and its modifications; nervous conduction speed. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 3. Control of the cellular functions; intercellular communication, transduction of the extracellular signals and intracellular signalling. Membrane receptors types. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 4. The structure of the skeletal muscle and its functional organisation (motor unit, motor plate). Mechanical properties of the skeletal muscle. Mechanisms of the muscle contraction: excitation, excitation-contraction coupling, molecular mechanism of the muscle contraction. PBL: muscle fatigue. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 5. Structural and functional organisation of the synapses; postsynaptic responses types; neuromediators classes. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 6. Smooth muscle contraction. Morphological and functional organisation of the vegetative nervous system. Physiology of the vegetative nervous centres: sympathetic and parasympathetic nervous system. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 7. Blood physiology: Blood plasma and blood cells. Haematopoiesis. Red blood cells physiology. PBL: red blood cells parameters and types of anemia. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 8. Blood physiology: the body's defence systems against microorganisms; leukocytes types and functions, inflammation. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 9. Blood physiology: lymphocytes types and functions; antibodies and their types of action; immunity. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 10. Blood physiology. Haemostasis: Platelets physiology and coagulation. PBL: blood transfusion rules, blood groups. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 11. Digestion physiology. Morphological and functional features of the digestive system. Mechanical and physical phenomena along digestion and their control. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 12. Digestion physiology. Chemical transformations of food constituents along digestion process. Digestive secretions and their regulation. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 13. Digestion physiology. Absorption. Regulation of food intake: hunger, satiety, energy metabolism and weight status. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| 14. Liver physiology. Roles of the liver: digestive, metabolic, excretory. PBL: jaundice types. | | - active-integrative  - PBL  - PC based projection | 3 hours |
| **Bibliography:**  1. Berne RM, Levy MN, Koeppen BM, et al: Berne & Levy: *Principles of Physiology*, 5th ed. St. Louis, Elsevier Mosby, 2004  2. Guyton AC, Hall JE: *Textbook of Medical Physiology,* 11th Ed. Philadelphia, Saunders, 2006. | | | |
| **8.2. Seminar / Laboratory** | **Teaching methods** | | **Comments** |
| 1. Introduction to the study of physiology; fundamental properties and organization levels of the living matter; experimental method in physiology: principles, experiments types, experimental models; investigation of functional parameters (data acquisition, storage, data analysis). | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 2. Cellular physiology. Membrane transport: classification, characteristics; osmosis: red blood cells fragility test; membrane potential. | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 3. Cellular physiology. Excitability and conductibility - study on the frog neuromuscular preparation; resting membrane potential, action potential; conduction velocity; electronervogram | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 4. Cellular physiology. Excitability and conductibility: global electromyography and motor unit electromyography; cronaxy | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 5. Contraction of skeletal and smooth muscles; in vitro study (twitch, tetanus, isometric and isotonic contraction); dynamometry, ergometry muscle fatigue; relative infatigability of the nerve. | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 6. Smooth muscle contraction: in vitro intestinal motility. Vegetative nervous system: vegetative reflexes with clinical importance. | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 7. Blood physiology, respiratory function: blood plasma and blood cells: hematocrite, erithrocyte sedimentation rate; RBC count | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 8. Blood physiology, respiratory function: Hemoglobin determination; blood spectroscopy; blood detection; red blood cells parameters; blood typing | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 9. Blood physiology, defence function: WBC count; leukocyte formula | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 10. Blood physiology, hemostasis: platelet count; bleeding time; coagulation time; prothrombin time (Quick) | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 11. Oral digestion: sampling of saliva; secretory mechanisms; chemical examination of saliva; digestive role and thermolability of the salivary amylase | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 12. Gastric digestion: gastric juice sampling; secretory mechanisms; HCl and lactic acid determination, measurement of the gastric juice acidity; action of labferment | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 13. Intestinal digestion: bile, pancreatic and intestinal juice sampling; Differentiation of gastric and intestinal proteolysis products; secretory mechanisms; determination of the pancreatic amylase. Bile: chemical and emulsifying properties of bile. | - team work  - computer models  - demonstration of the technique to be acquired | | 3 hours |
| 14. Revision |  | | 3 hours |
| **Bibliography:**  1. Slatineanu SM, Dumitriu IL, Vata LG, Cojocaru E, Gurzu B: *Principles and methods for practical lessons of physiology*, 1st ed. Iasi, Gr T Popa, 2012 | | | |

1. **Correlations between the contents of the discipline and the expectations of the epistemic community, of profesional associations and of employers in the 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. As primary goal the discipline intends to offer the students optimal background for the following years of study in the program for License in Medicine, in the perspective of successfully hiring, immediately after graduation, in residence programs from Romania and other EU countries |

1. **Evaluation**

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| **Type of activity** | **10.1. Evaluation criteria:** | **10.2. Methods of evaluation** | **10.3. Percentage of final grade** |
| **10.4. Lecture** | Grade for multiple choice test | standardized multiple choice test | 50% |
| **10.5. Seminar / Laboratory** | Average grade of ongoing examinations | ongoing evaluation | 10% |
| Grade for practical examination | practical exam | 40% |
| **Minimum standard of performance: at least grade 5 to pass the discipline** | | | |

**Date: 14 oct. 2019 Signiture of Didactic Co-ordinator**

**Prof. Dr. Ionela Lacramioara Serban**

**Signiture of Department Director Prof. Dr. Carmem Elena Cotrutz**