**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 Sciences 1** | | | | | | | |
| **1.3.** | **DISCIPLINE: Immunology** | | | | | | | |
| **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: IMMUNOLOGY** | | | | | | | |
| **2.2.** | **Teaching staff in charge with lectures:** Sef lucrari Dr. Florea Irina Daniela | | | | | | | |
| **2.3.** | **Teaching staff in charge with seminar activities:** Sef lucrari Dr. Florea Irina Daniela, Asist. Dr. Mariana Pavel Tanasa | | | | | | | |
| **2.4. Year** | | **II** | **2.5. Semester** | **I/II** | **2.6. Type of evaluation** | E1/E2 | **2.7. Discipline regimen** | mandatory |

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

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| * 1. **Number of hours per week** | 5 | **Of which: 3.2. lectures** | | 2 | * 1. **seminar/ laboratory** | 3 |
| * 1. **Total hours in the curriculum** | 64 | **Of which: 3.5. lectures** | | 28 | **3.6. seminar/ laboratory** | 36 |
| **Distribution of time** |  |  | |  |  | Hours |
| **Study time using coursebook materials, bibliography and notes** | | | | | | 44 |
| **Further study time in the libray, online and in the field** | | | | | | 24 |
| **Preparation time for seminars / laboratories, homework, reports, portfolios and essays** | | | | | | 14 |
| **Tutoring** | | | | | |  |
| **Examinations** | | | | | | 4 |
| **Other activities** | | | | | |  |
| **3.7. Total hours of individual study** | | |  | | | 86 |
| **3.8. Total hours / semester** | | |  | | | 150 |
| **3.9. Number of credits** | | |  | | | 6 |

1. **Prerequisites (where applicable)**

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| **4.1. curriculum** | Cellular and molecular biology concepts, physiology, and biochemistry fundamental benchmarks |
| **4.2. competences** |  |

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)** | Knowledge regarding:  • antigenicity and immunogenicity  • description of the immune system components  • mechanisms of self/non-self discrimination  • description of immune humoral and cellular responses  • description of molecules within the immunoglobulin superfamily  • hypersensitivities  • description of fundamental concepts of autoimmune processes and immunodeficiencies  • principles of immunological methods |
| **Transversal Competences (roles, personal and professional development)** | • team work  • foundations for integrative attitudes toward knowledge and skills acquired |

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

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| **7.1. General Obiective** | 1. antigenicity and immunogenicity  2. description of the immune system components  3. mechanisms of self/non-self discrimination  4. description of immune humoral and cellular responses  5. description of molecules within the immunoglobulin superfamily  6. hypersensitivities  7. description of fundamental concepts of autoimmune processes and immunodeficiencies  8. principles of immunological methods |
| **7.2. Specific Obiectives** | - theoretical training of students to assimilate knowledge on functional integration phenomena, from cell to organism; - educating students in the spirit of understanding rigor of medical and decisive role of basic sciences for their trening. |

1. **Contents**

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| **8.1. Lecture** | **Teaching methods** | **Comments** |
| 1.1. Terminology  1.2. Immunogenicity and antigen structure | - oral presentation  - power point support | 2 hours |
| 2. Innate immunity – natural barriers, cells and molecules | - oral presentation  - power point support | 2 hours |
| 3. Receptors for antigen –  3.1. BCR  3.2. TCR | - oral presentation  - power point support | 2 hours |
| 4. Genetics of antigen receptors | - oral presentation  - power point support | 2 hours |
| 5. Ontogeny of B and T lymphocyte  5.1. Primary lymphoid organs: thymus and bone marrow  5.2. T lymphocyte ontogeny  5.3. B lymphocyte ontogeny and stromal cell  5.4. Tγδ lymphocytes | - oral presentation  - power point support | 2 hours |
| 6. Major Histocompatibility Complex (MHC) | - oral presentation  - power point support | 2 hours |
| 7. Antigen processing and presentation | - oral presentation  - power point support | 2 hours |
| 8. B and T cell activation | - oral presentation  - power point support | 2 hours |
| 9. Functions and mechanisms of action of B and T effector cells | - oral presentation  - power point support | 2 hours |
| 10. Cytokines | - oral presentation  - power point support | 2 hours |
| 11. Immune response; Inflammation; Lymphocyte traffic | - oral presentation  - power point support | 2 hours |
| 12. Complement system | - oral presentation  - power point support | 2 hours |
| 13. Anti-bacterial, anti-viral and anti-parasite immunity | - oral presentation  - power point support | 2 hours |
| 14. Deviated immune response: hipersensitivities; types and general characteristics | - oral presentation  - power point support | 2 hours |
| **Bibliography**  1. Tak Mak, Mary E. Saunders: Primer to the Immune Response, Academic Press, Elsevier, 2011  2. Richard Goldsby, Thomas J. Kindt, Barbara Osborne : Kuby’s Immunology, 7th Edition, 2012  3. Kenneth Murphy, Casey Weaver: Janeway’s Immunobiology, New York, NY ,Garland Science/Taylor& Francis Group, 9-th edition, 2017 | | |
| **8.2. Seminar / Laboratory** | **Teaching methods** | **Comments** |
| 1. Antigenicity/immunogenicity: implications for the immunization process | - oral presentation  - power point support | 3 hours |
| 2. Cross–reactivity: practical applications | - oral presentation  - power point support | 3 hours |
| 3. Classes and subclasses of immunoglobulines | - oral presentation  - power point support | 3 hours |
| 4. Blood groups. ABO and Rh systems. T-dependent and T-independent antigens. Antibodies classes | - oral presentation  - power point support | 3 hours |
| 5. Ag-Ab interaction in agglutination reaction; Ag-Ab interaction in precipitation reaction | - oral presentation  - power point support | 3 hours |
| 6. Hibridoma, monoclonal antibodies | - oral presentation  - power point support | 3 hours |
| 7. Solid phase tests: RIA, RIST, RAST, ELISA | - oral presentation  - power point support | 3 hours |
| 8. Imunohistochemistry, imunofluorescence | - oral presentation  - power point support | 3 hours |
| 9. Blot: Western blotting, Southern blotting | - oral presentation  - power point support | 3 hours |
| 10. Flow-cytometry | - oral presentation  - power point support | 3 hours |
| 11. Cellular functionality tests | - oral presentation  - power point support | 3 hours |
| 12. Immunological investigation in immune pathology | - oral presentation  - power point support | 3 hours |
| **Bibliography**  1. Tak Mak, Mary E. Saunders: Primer to the Immune Response, Academic Press, Elsevier, 2011  2. Richard Goldsby, Thomas J. Kindt, Barbara Osborne : Kuby’s Immunology, 7th Edition, 2012  3. Kenneth Murphy, Casey Weaver: Janeway’s Immunobiology, New York, NY ,Garland Science/Taylor& Francis Group, 9-th edition, 2017 | | |

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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| The objectives of the discipline are the knowledge and the skills included in the analitical programmes, reviewed annualy. Once analyzed by the members of the discipline, they are further discussed and approved by the Curricular Office so that they are harmonized with other disciplines. The correspondence between the curricula and the expectations of the academic community, profesional associations and employers in the field is systematically evaluated. As a primary aim, the discipline offers to the students optimal knowledge for the next years of study in Bachelor Study Cycle, and, further, for Residency programmes in Romania, asa well as in other UE 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: Signiture of Didactic Co-ordinator**

**10.10.2019 Prof. Dr. Petru Cianga**

**Signiture of Department Director Conf. Dr. Cristinel Stan**