

COURSE OUTLINE “MOLECULAR IMMUNOBIOLOGY”

1. GENERAL

SCHOOL	HEALTH SCIENCES		
DEPARTMENT	MOLECULAR BIOLOGY AND GENETICS		
STUDY LEVEL	ISCED LEVEL 6		
COURSE CODE	MBG308	SEMESTER	5 th
COURSE TITLE	MOLECULAR IMMUNOBIOLOGY		
TEACHING ACTIVITIES	HOURS/WEEK	ECTS CREDITS	
<i>In case credits are awarded to individual components of the course eg. Lectures, laboratory practicals, etc. If credit units are awarded for the whole course, indicate the weekly teaching hours and total credits</i>	4	5	
COURSE TYPE <i>General, Background, Scientific field course, Expertise Course, Skills Development etc</i>	SCIENTIFIC AREA		
PREREQUISITE COURSES:	NO		
LANGUAGE OF TEACHING AND EXAMINATIONS:	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	https://eclass.duth.gr/courses/ALEX01125/		

2. LEARNING OUTCOMES

Learning outcomes

Describe the learning outcomes of the course, the specific knowledge, skills and competencies that students will acquire after successfully completing the course. Refer to Appendix A.

- Description of learning outcomes for the course according to the level of study - refer to the European Higher Education Area Qualifications Framework
- Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Annex B Curriculum Vitae Summary Guide

The objectives of the course are:

- To acquire knowledge on the field of Molecular Immunobiology
- To gain knowledge about the structure and organization of the immune system
- To understand the basic principles of the immune system's function and regulation
- To study and get insight into the complex mechanisms underlying the innate/natural and adapted/acquired/specific immune responses

LEARNING OUTCOMES:

After successfully completing the course, students will acquire the following knowledge, skills and competencies:

- They should know the basic principles of the structure, organization and function of the immune system
- They should know and understand the complex molecular mechanisms underlying immune responses
- They should be able to examine and analyze comparatively immune responses of innate immunity vs. adaptive immunity
- They should be able to examine, analyze comparatively immune responses underlying humoral vs. cell-mediated immunity
- They should know and understand the basic and novel strategies and experimental technologies used in Molecular Immunobiology
- They should be able to solve problem-based questions in the field of Molecular Immunobiology

General Skills

Which of the general competencies that the student will have acquired on the completion of the studies (see also the Diploma Supplement and below) are relevant to this course?

<i>Research, analysis and synthesize of data and information, using the necessary technologies</i> <i>Adaptation to new situations</i> <i>Decision making</i> <i>Autonomous work</i> <i>Team work</i> <i>Work in an international environment</i>	<i>Work in an interdisciplinary environment</i> <i>Production of new research ideas</i> <i>Project design and management</i> <i>Respect for diversity and multiculturalism</i> <i>Respect for the natural environment</i> <i>Development of social, professional and moral responsibility and gender sensitivity</i> <i>Promotion of free, creative and inductive thinking</i>
<ul style="list-style-type: none"> • Research, analysis and synthesis of data and information, using the necessary technologies • Production of new research ideas • Promotion of free, creative and inductive thinking • Decision making • Autonomous work • Adaptation to new situations • Project design and management 	

3. COURSE CONTENT

<ul style="list-style-type: none"> • Overview of the immune system – Cells and Organs of the immune system • Innate/Natural immunity and Adapted/Acquired/Specific immunity: principles - mechanisms of recognition and function – Cytokines – Inflammation and inflammatory response • Antigens – Epitopes – Immunogenicity – Antigenicity – Haptens – Pattern Recognition Receptors (PRR) – Antibodies – Antibody structure, Antibody isotypes and Antibody functions – Polyclonal and Monoclonal antibodies – B cell receptor (BCR) and T cell receptor (TCR) – Antibody-Antigen interactions – principles and applications • Organization and Expression of immunoglobulin genes and lymphocyte receptor genes – mechanisms of generation of Diversity in antigen receptors – Somatic recombination – Somatic hypermutation – Isotype switch – antibody genes and engineering • Major histocompatibility complex (MHC) – Organization – Heredity – Polymorphisms – Cell distribution – MHC and immune response ability • Antigen Processing and Antigen Presentation – MHC restriction – Antigen-presenting cells (APC) – Dendritic cells - Endogenous (cytoplasmic) and exogenous route of antigen processing and presentation - Presentation of peptide and non-peptide antigens • T cell Development: Maturation, Activation and Differentiation of T cells – Thymus, Positive and Negative selection – Activation and Differentiation of Mature T cells – Immune Tolerance – T cell receptor: structure, organization, gene rearrangement – T cell receptor complex – T cell Alloreactivity • B cell Development: Generation, Activation and Differentiation of B lymphocytes – Maturation, Activation and Proliferation – Humoral immune responses – Germinal centers • Complement system – Pathways of Complement activation - Components of Complement – Functions of Complement – Regulation of Complement activity - Biological consequences of Complement activation • Cell-mediated immunity – Effector cells and Cell-mediated immune responses – Cytotoxic T lymphocytes – Natural killer cells – Circulation and Migration of lymphocytes • Primary and Secondary immune responses – T cell and B cell memory
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- Immune responses to Infectious agents (bacteria, viruses, yeast, protozoa, helminths) – Infectious diseases
- Passive and Active Immunization – Vaccines – Vaccine Development

4. TEACHING and LEARNING METHODS - EVALUATION

TYPE OF TRAINING <i>Face-to-face, Distance learning, etc..</i>	Face to face										
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, and in communication with the students</i>	Use of ICT in Teaching Use of ICT in Communication with students										
MODES OF DELIVERY <i>Describe the teaching methods in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, practicum, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i>	Instructional teaching in conjunction with collaborative teaching strategies and integrating technology <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #d9ead3;">Activity</th> <th style="background-color: #d9ead3;">Workload/semester</th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>52</td> </tr> <tr> <td>Seminars</td> <td>8</td> </tr> <tr> <td>Study & analysis of bibliography</td> <td>90</td> </tr> <tr> <td>Course Total</td> <td>150</td> </tr> </tbody> </table>	Activity	Workload/semester	Lectures	52	Seminars	8	Study & analysis of bibliography	90	Course Total	150
Activity	Workload/semester										
Lectures	52										
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STUDENT PERFORMANCE EVALUATION <i>Describe of the methods of evaluation language, methods of evaluation, types of exams, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other Are evaluation criteria known to the students?</i>	Student evaluation languages Greek Method (Formative or Concluding) Formative Student evaluation methods Written exam with multiple choice test (60%) Written Exam with Short Answer Questions (20%) Midterm exam (20%)										

5. SUGGESTED BIBLIOGRAPHY

Translated in Greek language:

1. **'MOLECULAR and CELLULAR IMMUNOLOGY'** – Abbas AK, Lichtman AH, Pillai S, 9th edition 2017, translated in Greek language 2019, Utopia Publishing/Elsevier, p. 688, ISBN: 978-618-5173-39-5, *Eudoxus code:* 86197140
2. **'BASIC IMMUNOLOGY'-Functions and Disorders of the Immune system»** - Abbas A, Lichtman AH, Pillai S, 5th edition/2015, translated in Greek language 2018, Vasiliadis Medical Books/Broken Hill Publishers LTD, p. 520, ISBN: 978-996-327 4505, *Eudoxus code:* 77106913
3. **'IMMUNOLOGY'** - Goldsby R, Kindt T, Osborne B, Kuby J, 6th edition 2007, translated in Greek language 2013, Paschalidis Medical Publications/Broken Hill Publishers Ltd., p. 840, ISBN: 978-9963-716-14-2, *Eudoxus code:* 23076003
4. **'IMMUNOLOGY'** - Roitt I, Brostoff J, Male D, Roth DB, 8th edition/2012, translated in Greek language 2016, Parisianou Publications/Saunders, p. 468, ISBN: 978-960-583-123-3, *Eudoxus code:* 59396376
5. **'Lippincott's IMMUNOLOGY'** - Harvey RA, Doan T, Melvold R, Viselli S, Waltenbaugh C, 2nd edition/2012, translated in Greek language 2014, Parisianou Publications/Wolters Kluwer, p. 388, p.

386, ISBN: 978-960-394-98-62, *Eudoxus code*: 33134131

6. **'BASIC CLINICAL IMMUNOLOGY'** – Chapel H, Haeney M, Misbah S, Snowden N, 5th edition/2006, translated in Greek language 2013, Parisianou Publications/Wiley-Blackwell, p. 448, ISBN: 978-960-394-960-2, *Eudoxus code*: 33074641

In English language:

7. **'Kuby IMMUNOLOGY'** – Punt J, Stranford SA, Jones PP, Owen JA, 8th edition 2018, WH Freeman, p. 944, ISBN: 978-131-911-4701
8. **'Cellular and Molecular IMMUNOLOGY'** – Abbas Ak, Lichtman AH, Pillai, S, 9th edition 2017, Elsevier, p. 608, ISBN: 978-032-347-9783
9. **'Janeway's IMMUNOBIOLOGY'** – Murphy KM, Weaver C, 9th edition 2016, WW Norton, p. 924, ISBN: 978-081-534-5053

Course notes

Course lecture notes and lecture presentations are available through the *e-class* platform.