Course Title	**Introduction to Immunology**				
Course Code	ABS209				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	2nd year/ 3rd semester				
Teacher's Name	Prof. Maritsa Gourni, Dr Vasilia Tamamouna				
ECTS	6	Lectures / week	3	Laboratories / week	2
Course Objectives	Immunology is the branch of biology studying the structure, function and pathology of the immune system. The main objective of this course is to provide students with knowledge on the fundamentals of the human immune system on the molecular, cellular and whole organism level. Furthermore, this course aims to provide examples of immune-related pathology, clinical diagnosis and treatment options.				
Learning Outcomes	At the completion of this course students are expected to: • Understand the primary role of the immune system as the barrier to infection, as well as its extending functions in human pathophysiology. • Comprehend the different roles of innate and adaptive immunity, as well as the interface and inter-dependence of the two branches of the immune system. • Understand the anatomy of the immune system, and the role of lymphoid and non-lymphoid organs in hematopoiesis and differentiation of immune cells. • List and describe the different cell types and their roles in the immune system. • Have a thorough understanding of how both innate and adaptive immune cells recognize foreign pathogens and how this activates the immune response at the molecular level. • Describe the different aspects of the adaptive response (cellular vs humoral), as well as understand how specificity is gained in the development of its mediators. • Identify and classify examples of common human pathogens as well as describe pathogenesis and immune responses to these infections. • Understand the pathogenesis of other diseases of the immune system beyond infection, primarily tumorigenesis and autoimmune disorders. • Provide examples of autoimmune disorders while understanding the role of immune system in the pathogenesis.				
Prerequisites	none	Required	None		

Course Content	Theory • History of Immunology. • Role of immunity as the primary barrier against pathogens. • Key nomenclature in Immunology (Antibody, antigens, cell types, cytokines, CD molecules, HLA molecules). • Different types of cells in the immune system, along with their fundamental roles. • Pattern recognition of pathogens by innate and adaptive immune receptors. • Intracellular signal transduction pathways, from receptor activation to immune gene expression. • Anatomy of the immune system: Primary lymphoid organs (bone marrow, thymus), secondary lymphoid organs (spleen, lymph nodes) and non-lymphoid organs (eg. liver) location, function, architecture and roles in immunity development and activation. • Emphasis in the processes of haematopoiesis and B-T interaction. • T-cell activation and adaptive cellular response. Expand to the different types of T-cell immunity (Th1, Th1, Th17, Treg). • B-cell activation and adaptive humoral response (antibody structure, isotypes, mechanisms of action (neutralisation, opsonisation, complement activation). • The complement system. • Mechanics of the antibody:antigen complex, structure of T/B-cell receptors and how diversity is generated through development (VDJ recombination, allelic exclusion, alternative splicing). • The MHC, antigen processing and presentation. • Interface between innate and adaptive systems (previous lectures on intracellular signalling and immune system anatomy sets the background for this lecture). • Lymphocyte differentiation (positive selection and negative selection) - how defects in negative selection can lead to autoimmunity • How overreactive humoral response leads to hypersensitivity. • Cytokine regulation of immune responses (categories of different cytokines, functions, roles). • Tolerance (and when it goes wrong, eg in tumours, chronic diseases, autoimmune diseases) • Immunological memory • Cancer immunology • Examples of some common bacteria/parasites/viruses and introduction to some fundamental immune responses to famous pathogens. • Once the basis is covered for basic immune pathologies (infections, tumours and autoimmune diseases), introduce clinical immunology, diagnosis and treatment options. • Mechanisms of drug treatments of immune diseases, vaccine development and engineering. Laboratory exercises: • Disinfection and sterilisation methods. • Introduction to mammalian cell culturing. • Perform ELISA analysis

	• Fundamental immunostaining (immunohistochemistry) • Identify the different immune cells with the use of microscopic methods • Blood group testing
Teaching Methodology	The teaching of the course includes lectures to help students understand the theoretical background, and laboratory exercises in order to get a better comprehension of the main concepts of Microbiology. Methods such as discussion, questions/answers, and pros/cons, are used to enhance student's participation. PowerPoint and image-rich material and short animations are used to better understand the content of Microbiology. The laboratory exercises are conducted in the Biology and Biochemistry Laboratory using the appropriate laboratory equipment, under the instructor's supervision. Appropriate preparation and demonstration by the laboratory supervisor precedes each laboratory exercise. Assessment of laboratory exercises includes laboratory reports submitted by each student at the end of each lab exercise.
Bibliography	Textbooks: • Janeway's Immunobiology (Tenth Edition) 10th Edition, by Kenneth M. Murphy , Casey Weaver, Leslie J. Berg • Cellular and Molecular Immunology, 10th Edition, Authors : Abul K. Abbas & Andrew H. Lichtman & Shiv Pillai References: A list of recently published articles will be provided for further reading.
Assessment	Course Work 40% • Mid-term Test 20% • Lab reports 20% Final Exam 60% For student evaluation, the overall grade is determined by a written midterm exam (20%), a laboratory grade (20%) and a written final exam (60%). The mid-term exam is carried out between the 6th and 8th week and it mainly includes short answer- questions and problem- solving questions and examines specific modules of the course. As far as the laboratory grade is concerned, it comprises of the evaluation of the laboratory reports (60% of the laboratory grade) submitted by the students after every experiment and a final laboratory examination (40% of the laboratory grade) which mainly includes short answer questions and problem-solving questions. In their laboratory reports, students are asked to describe the experimental procedure, to evaluate and analyse their results and to answer specific questions. The following criteria are taken into account when evaluating laboratory reports: (a) experimental data collection (30%), (b) data analysis (40%), and application of theory to draw conclusions (30%). The final exam of the course is carried out during the 14th-16th week of each semester and includes short answer questions, decision questions,

	and problem-solving questions regarding all course modules. The final assessment of the students is formative and summative and is assured to comply with the subject's expected learning outcomes and the quality of the course.
Language	Greek English