



Course Syllabus

Course Code	Course Title	ECTS Credits
IMMU-541	Cellular and Molecular Immunology	7.5
Prerequisites	Department	Semester
None	Life Sciences	Fall
Type of Course	Field	Language of Instruction
Concentration- Immunology	Biomedical Sciences	English
Level of Course	Lecturer(s)	Year of Study
2 nd Cycle	Dr. Nicolaou Stella	1 st
Mode of Delivery	Work Placement	Co-requisites
Face-to-face	N/A	None

Course Objectives:

The aim of this course is to provide a solid inside into the field of Immunology and an overview of the different immunological mechanisms associated with a range of diseases. The course is orientated so as to provide students with an expanded knowledge on the relevance of the components of the immune system in diagnostics and treatment of disease.

Main aims of this course are to:

- Enhance the knowledge of students regarding the cellular and molecular components of the immune system, in terms of their origin, morphology and functions.
- Help students acquire an understanding of the anatomy of the various lymphoid tissues and their involvement in the initiation of adaptive immune responses.
- Enable students to distinguish between innate and adaptive immunity and appreciate the various cellular interactions and pathways involved in the induction and regulation of immune responses.
- Provide students with a better inside into antibody-mediated responses, and appreciate the importance of the dose, nature, and route of administration of antigen in elicitation of response.
- Enhance knowledge about cellular and molecular interactions involved in T-cell and B-cell mediated responses.

Learning Outcomes:

After completion of the course, students will be expected to use the knowledge of current immunological principles to:

1. Identify the cells and molecules involved in innate and adaptive immunity.
2. Discuss pathogen recognition, antigen presentation and response in innate and adaptive immunity.
3. Explain in detail the processes in T-cell and B-cell development and maturation.
4. Discuss the differentiation and effector functions of T cells and antibodies.
5. Relate the principles functions of the immune system to pathological processes and evaluate the importance of the immune response in disease states.
6. Critically analyze, present and discuss the relevant research literature

Course Content:

1. Properties, cells and tissue of the immune system
 - White blood cells, their role and function in innate and adaptive immunity
 - Lymphoid organs and their role in initiation of adaptive immune responses
 - Principles of Innate and Adaptive immunity
 - Adaptive immunity and its importance in mediating effective responses
2. Innate Immunity
 - Pathogen recognition
 - Cellular Components
 - Soluble Factors
 - The inflammatory and antiviral response
 - The complement cascades
3. Adaptive immunity and molecular components
 - Generation of B lymphocytes
 - Selection of B cells
 - Generation of T lymphocytes in the thymus
 - Positive and negative selection in the thymus
4. Induction and manipulation of humoral immune response
 - Antibody molecules as secreted immunoglobulins
 - Antibody molecules as transmembrane proteins; the B-cell antigen receptor
 - Measuring antibody levels
 - Uses of antibodies in current medicine
 - Antibody-antigen complexes and T cell recognition
 - Antibody production and function during humoral immunity
5. T-cell mediated immunity
 - Insides into the T-cell receptor complex
 - Production and action of effector T-cells
 - Cytotoxic T-cells and their contribution to adaptive immunity
 - T helper cells subtypes (Th1, Th2, Th17 etc)
 - CAR T cells and treatment

6. Effector mechanisms
- Humoral immunity
 - T cell-mediated immunity

Learning Activities and Teaching Methods:

Lectures; problem-based learning, poster and/or oral presentations of medical/research papers. The lecturer will be introducing each topic through lecture presentations. After a set of lectures on a topic, a problem based learning section will follow to encourage learning through collaborative work and literature research. There will be an individual research paper presentation where students will have to discuss and critically evaluate the papers while the lecturer acts as a moderator.

Assessment Methods:

Assignments, Presentations, Mid-term Exam, and Final Exam

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Cellular and Molecular Immunology 10 th Edition	Abul K. Abbas, Andrew H. H. Lichtman, Shiv Pillai	Elsevier Saunders	2021	ISBN-13: 978-0323222754 ISBN-10: 0323222757

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Basic Immunology E-Book : Functions and Disorders of the Immune System 5 th Ed.	Abbas, Abul K. Lichtman, Andrew H. Pillai, Shiv Baker, David L. Baker, Alexandra		2016	ISBN-10: 0-8153-3642-X ISBN-13: 978-0815342434
Janeway's Immunobiology 10 th Edition	Kenneth Murphy	Garland Science	2022	ISBN-10: 0-8153-3642-X ISBN-13: 978-0815342434

Essentials : Roitt's Essential Immunology (12)	Delves, Peter J. Martin, Seamus J. Burton, Dennis R.	Wiley- Blackwell	2011	Ebook ISBN: 9781118293850 (link below)*
*http://site.ebrary.com/lib/unicosia/reader.action?docID=10518738				