



كلية الطب البشري  
Faculty of Medicine



## The Hashemite University

### Course Syllabus

#### Medical Immunology

1	Course title	Medical Immunology
2	Course number	0111501208
3	Credit hours (theory, practical)	3
	Contact hours (theory, practical)	6 hours lectures per week
4	Course meeting time	Sun-Tues-Thu 9-11
	Course location	Medical College Stadium
5	Program title	Doctor of Medicine
7	Awarding institution	The Hashemite University
8	Faculty	Faculty of Medicine
9	Department	Basic medical sciences
10	Level of course	Second year medical students
11	Year of study and semester (s)	2018/2019 Summer semester
12	Final Qualification	MD degree
13	Other department (s) involved	None
14	Language of Instruction	English
15	Date of production/revision	01/2019

**Course Coordinator:**

Dr. Mohammad Altamimi, MD, PhD  
Office 3038, 3<sup>rd</sup> Floor, Faculty of Medicine  
Office hours: Sun, Mon and Wednesday, 1-3 pm  
Phone: 053903333 ext. 5563  
E-mail: mohammad.altamimi@hu.edu.jo

**Course Description:**

This discipline concerned with the study of the immune system of humans that has evolved to protect against infection by pathogens such as microbes, viruses and parasites. The course aims to provide a basic understanding of the immune system of mammals, with particular emphasis on human immunology and its relationship to health and disease. Immunology overlaps with many other biological disciplines including biochemistry, molecular biology, cell biology, genetics, physiology, microbiology, virology and parasitology; it relies on methods and concepts derived from these disciplines and in turn makes a major contribution to them and some of the newer disciplines such as biotechnology. The course aims to provide students with an appreciation of these relationships while providing knowledge of the molecular and cellular basis of the immune system.

**Intended Learning Outcomes (ILOs):**

After attending this course, students should achieve the following learning outcomes:

1. Understand the general principles of human immunology
2. Describe the functions of the immune system in health and diseases
3. Dissects the different lines of defense of human body
4. Connects the immunology science with other closely related sciences including microbiology, hematology, molecular biology, and blood banking
5. Understand the complexity and interactions of different cells and pathways of the immune system
6. Understand the pathophysiology of diseases related to the immune system
7. Understand the roles of drugs targeting the immune system in prevention and treatment of diseases
8. Understand the role of immunodiagnostic assays in clinical practice
9. Appreciate the new advances in the immunology field

**Topic Outline and Schedule:**

Week	Lecture	Topic	Objectives
1	1	General Introduction to the Immune System	<ol style="list-style-type: none"> <li>1. Definition of Immunology</li> <li>2. Importance of Immunology</li> <li>3. Historical background of Immunology</li> <li>4. Modern Immunology</li> <li>5. Outline the major principles of the human immune response (innate immunity, humoral immunity, and adaptive immunity)</li> </ol>
	2	Organs and Cells of the Immune System	<ol style="list-style-type: none"> <li>1. The organs and tissues of the immune system</li> <li>2. Hematopoiesis and formation of blood cells</li> <li>3. Immune cells classes, functions and circulation</li> <li>4. Immune cells development and maturation</li> </ol>
	3	Leukocyte Activation and Migration	<ol style="list-style-type: none"> <li>1. Understand the main steps of leukocytes migration and circulation</li> <li>2. Understand the main adhesion molecules involved in leukocytes adhesions</li> <li>3. Understand the roles of chemokines in leukocytes activation</li> </ol>
2	1	Antigen Structure, Processing and Presentation	<ol style="list-style-type: none"> <li>1. Definition of antigens and epitopes</li> <li>2. Types and sources of antigens</li> <li>3. Antigen processing and presentation</li> <li>4. The roles of Major Histocompatibility Complex (MHC)</li> <li>5. Discuss the role of antigen presentation in generating immunity</li> </ol>
	2	Antibodies (Immunoglobulin)	<ol style="list-style-type: none"> <li>1. Immunoglobuline structure and binding site/s</li> <li>2. Immunoglobuline classes and their characteristics</li> <li>3. the role of Immunoglobulines in neutralization, opsonization, antibody-dependent cellular cytotoxicity (ADCC), complement and mucosal immunity</li> <li>4. Introduction to artificial antibodies including monoclonal and polyclonal antibodies</li> </ol>
	3	Antigen Antibody Reaction	<ol style="list-style-type: none"> <li>1. Discussion of general principles of antigen-antibody interactions</li> <li>2. Definition and importance of affinity, avidity, and cross reactivity</li> <li>3. Laboratory methods used for visualizing antigen-Antibody Reactions</li> </ol>
3	1	Principles of Innate Immunity	<ol style="list-style-type: none"> <li>1. Discuss the concept of innate immunity - features, importance.</li> <li>2. Explain how the innate immune system recognizes foreign antigens in general.</li> <li>3. Outline the components of the innate immune system.</li> <li>4. Discuss how these components combat various foreign antigens.</li> </ol>

	2	Inflammation	<ol style="list-style-type: none"> <li>1. Overview of the inflammatory process: initiation, inflammation, resolution</li> <li>2. Benefits and liabilities</li> <li>3. Major constituents</li> <li>4. Types and classification of inflammation</li> <li>5. Clinically relevant inflammatory processes</li> <li>6. Control of inflammation</li> </ol>
	3	Cytokines in Immunology	<ol style="list-style-type: none"> <li>1. Definition and general properties of cytokines</li> <li>2. Classification of cytokines</li> <li>3. Cytokine receptor</li> <li>4. Biological functions of cytokines</li> <li>5. Cytokines and diseases</li> </ol>
4	1, 2, and 3	Principles of Adaptive Immunity (Cellular and Humoral Immunity)	<ol style="list-style-type: none"> <li>1. Explain the principles of adaptive immunity</li> <li>2. Introduce the immune cells that mediate adaptive immunity and their specific roles in immune response to varying pathogens/antigens</li> <li>3. Discuss the differences between cell-mediate immunity and humoral immunity</li> <li>4. Explain what interactions are required for activation of T cells and B cells</li> <li>5. Discuss the stages of cellular and humoral immunity</li> <li>6. Discuss immunological memory and outline the differences between primary and secondary (memory) responses</li> <li>7. Compare and contrast the innate and adaptive immune response</li> </ol>
5	1	Autoimmunity and Tolerance	<ol style="list-style-type: none"> <li>1. Define and discuss the general characteristics of tolerance</li> <li>2. Define the main factors that influence the development of tolerance</li> <li>3. Identify the main mechanisms of tolerance induction in B and T cells</li> <li>4. Identify the mechanisms involved in the development of autoimmunity</li> <li>5. Approach to treatment of autoimmune diseases</li> </ol>
	2	Tumour Immunology	<ol style="list-style-type: none"> <li>1. Introduction to tumors types and aetiology</li> <li>2. Tumors associated antigens and markers</li> <li>3. Evidence for Immune Reactivity to Tumors</li> <li>4. Discuss immune protection against tumors and immune surveillance sys</li> <li>5. Discuss immune mediated tumor growth</li> <li>6. Provide an overview of experimental cancer therapies</li> </ol>

	3	Hypersensitivity states I-IV	<ol style="list-style-type: none"> <li>1. What is the difference between hypersensitivity and protective immunity?</li> <li>2. Overview of the four major classifications of human hypersensitivity.</li> <li>3. Type I hypersensitivity – Mechanisms (allergens, Th2 immunity, IgE, immediate and late phase reactions) and clinical overview</li> <li>4. Type 2, 3,4 hypersensitivities – Mechanisms and clinical consequences</li> <li>5. Currently practiced vs. novel (experimental) approaches to clinical management of hypersensitivity.</li> </ol>
6	1	Immunodeficiency Diseases	<ol style="list-style-type: none"> <li>1. Outlines different types of autoimmune deficiencies</li> <li>2. Differentiates primary and secondary autoimmune deficiencies</li> <li>3. Discuss the common characteristics and the major clinical diseases of <ul style="list-style-type: none"> <li>• B cell deficiency</li> <li>• T cell deficiency</li> <li>• Combined deficiency</li> <li>• Phagocytic deficiency</li> <li>• Compliment deficiency</li> </ul> </li> </ol>
	2	Acquired Immune Deficiency Syndrome (AIDS)	<ol style="list-style-type: none"> <li>1. Introduction, history and epidemiology</li> <li>2. Virology and classification of HIV</li> <li>3. Transmission and pathogenesis</li> <li>4. Clinical presentation, investigations, prevention and treatment</li> <li>5. Current state of new drugs and vaccine trials</li> </ol>
	3	Transplantation Immunology	<ol style="list-style-type: none"> <li>1. Understand the main principles and applications of transplantation immunology</li> <li>2. Understand the different mechanisms of transplant rejection and its clinical manifestations</li> <li>3. Discuss laboratory investigations applied to transplantation</li> <li>4. Understand the role of immune suppressive drugs in transplantation</li> </ol>
7	1	Vaccines: Principles and Practice	<ol style="list-style-type: none"> <li>1. Differentiates active and passive immunity</li> <li>2. To understand the types of currently used vaccines, the differences, and the mechanisms of protection</li> <li>3. Vaccination scheme, routes of administration, and common side effects</li> <li>4. To understand how to develop a vaccine and the general requirements for vaccine development and adjuvants</li> <li>5. To understand the new concept of vaccines against non-microbes such as self or tumor molecules</li> </ol>
	2	New Advances in Immunology	<ol style="list-style-type: none"> <li>1. New development in immunostimulants and immunosuppressant drugs</li> <li>2. Antibody based treatment</li> <li>3. Development of new vaccines</li> </ol>

			4. Immunodiagnostics and new assays
	3	Revision and Discussion	1. Case studies 2. Open discussion 3. Mock exams
8		Final Exam	

**Teaching Methods and Assignments:**

<p><b>Development of ILOs is promoted through the following teaching and learning methods:</b></p> <ol style="list-style-type: none"> <li>1. Lectures-Power Point presentations</li> <li>2. Departmental hand-outs, animations, educational movies, illustrations, Self-readings</li> <li>3. Textbooks</li> </ol>
---

**Evaluation Methods:**

Grades are based on the following:

First Exam	30 Marks
Second Exam	30 Marks
Final Exam	<u>40 Marks</u>
Total	100 Marks

**Course Policies:**

<p>Late Assignments: According to college policy          Missed exams: According to college policy          Absence : According to college policy          Cheating: According to college policy          Classroom Protocol: According to college policy          Student rights and responsibilities: According to college policy</p>
--

**References:**

Author	Title
Nairn & Helbert	Immunology for Medical Students, latest edition.
Abbas and Lichtman	Basic Immunology, latest edition.
Chapel & Haeney	Essentials of Clinical Immunology, latest edition.
Kayser	Basic Principles of Immunology, latest edition.

**Additional information:**

<p>The summer semester is 8 weeks:          - 7 weeks lectures as outlined above and the last week for final exam          - Course Start: On the first working day of the summer semester for second year medical students.</p>
--