Course plan

Year: 2025	**Semester:** ☐First, ■Second, ☐Summer	**Number of students: 12**
Major: Medical immunology	■Basic sciences, ☐Physiopathology	**Department:** Bacteriology and immunology
Course Title: Fundamentals of Medical Immunology	■Theoretical, ☐Practical	**Credit:** **Code N.:** 122104۳
Prerequisite:	**Day & Time:** Wednesday & ۱۰-۱۳	**Course type:**
Instructor:	**Office address:**	**Tel:** 09171747335
Email: safoora.pordel@gmail.com	**Response Hours and Days:**	**Student representative name and mobile number:**

Main objective: This course presents the general concepts of basic immunology and describes the steps involved in generating an immune response, from the entry of antigen to the formation of effector cells and the response to antigen and effector factors.

On completion of this course, the student will be able to:

۱. Know about history of immunology, ontogeny of the immune system
۲. Know about Antigen and Immunogen: Structure of various antigens – superantigens and mitogens – T-cell dependent and non-dependent antigens, haptens, tolerogens
۳. Learn about Development, differentiation, and maturation of B lymphocytes, granulocytes, and monocytes in the bone marrow
٤. Explain Development, differentiation, and maturation of T and NK lymphocytes (ILCs) in the thymus
٥. Explain Structure and function of immunoglobulins: Molecular structure of immunoglobulins including variable region, hinge, specific function of immunoglobulins
٦. Explain Rearrangement of the antigen receptor gene structure of B and T lymphocytes, molecular mechanisms of receptor diversity, allelic exclusion and allelic inclusion, and their role in diversity and tolerance
۷. Explain Major histocompatibility complex, gene and protein structure of Classical MHC, introduction to the HLA nomenclature system and its application in transplant centers, genetics, inheritance and variation in MHC expression
۸. Explain Antigen processing and presentation to T cells, MHC I pathway, MHC II pathway, Cross presentation, Presentation of non-protein antigens
۹. Explain Circulation of leukocytes in blood vessels, lymphatic vessels and tissues, chemokines and their receptors, adhesion molecules, circulation pathway of naïve lymphocytes, circulation pathway of activated lymphocytes and memory
۱۰. Explain Innate immune molecules and receptors, soluble factors of innate immunity (complement and its control pathways,), pattern recognition receptors and their types, inflammasom and its activation mechanisms
۱۱. Explain Inflammation and Innate Immune Responses, Phagocytosis Mechanisms of Dendritic Cell Types and Their Role in the Immune Response, Monocyte Types and Their Role in the Immune Response, Neutrophil Types and Their Role in the Immune Response, Mechanisms of Inflammation and the Role of Cell Types, Mechanisms of the Immune System to Inhibit and Control Inflammation
۱۲. Explain Innate lymphoid cells including NK and their receptors, innate lymphoid cell receptors with emphasis on NK, how antigen is recognized by innate lymphoid cells including NK, including their activation mechanisms and signaling pathways
۱۳. Explain How antigen recognition and activation of B and T lymphocytes: Structure of antigen receptor of T lymphocytes, How antigen recognition and activation of T lymphocytes, Structure of antigen receptor of B lymphocytes, How antigen recognition and activation of B lymphocytes
۱٤. Explain Humoral immune responses, microanatomy and histology of lymph nodes, microanatomy and histology of the spleen with emphasis on the location of different B lymphocyte subtypes
۱٥. Explain Cellular immune responses, T helper lymphocyte subsets with emphasis on functional and molecular characteristics, the role of CD4 T lymphocytes in the activation and function of CD8 T lymphocytes
۱٦. Explain Immune system of the skin and mucosal surfaces

References (Text books):

١- Cellular and Molecular Immunology, EIGHTH EDITION, Abul K. Abbas

Student evaluation and the value related to each evaluation:
(The assessment tools that will be used to test student ability to understand the course material and gain the skills and competencies stated in learning outcomes)

ASSESSMENT TOOLS	From
Assignments	-
Quiz	2
Presence in online courses	-
Midterm Exam	8
Final Exam (Written exam)	10
TOTAL MARKS	**20**

Students responsibilities:

١- 1- Mobile phones must be turned off during class or exams.
٢- 2- Attending class on time
٣- 3- It is necessary for the student to attend all class hours. Unexcused absence during the course will result in a grade deduction.

Discipline and educational rules:

١- It is applied according to the regulations of the educational regulations.

Mid exam date: **Final exam date:**

Row	date	Time	Topic	Professor	References	Chapter	Pages
1	April/17	10-12	Introduction: History of immunology, ontogeny of the immune system	Dr.Pordel	Cellular and Molecular Immunology	1	
2	April/24	10-12	Antigen and Immunogen: Structure of various antigens – superantigens and mitogens – T-cell dependent and non-dependent antigens, haptens, tolerogens	Dr.Pordel	Cellular and Molecular Immunology	5	
3	April/30	10-12	Development, differentiation, and maturation of B lymphocytes, granulocytes, and monocytes in the bone marrow	Dr.Pordel	Cellular and Molecular Immunology	2,8	
4	May/7	10-12	Development, differentiation, and maturation of T and NK lymphocytes (ILCs) in the thymus	Dr.Pordel	Cellular and Molecular Immunology	8	
5	May/14	10-12	Structure and function of immunoglobulins: Molecular structure of immunoglobulins including variable region, hinge,	Dr.Pordel	Cellular and Molecular Immunology	5	

			specific function of immunoglobulins				
6	May/21	10-12	Rearrangement of the antigen receptor gene structure of B and T lymphocytes, molecular mechanisms of receptor diversity, allelic exclusion and allelic inclusion, and their role in diversity and tolerance.	Dr.Pordel	Cellular and Molecular Immunology	8	
7	May/28	10-12	Major histocompatibility complex, gene and protein structure of Classical MHC, introduction to the HLA nomenclature system and its application in transplant centers, genetics, inheritance and variation in MHC expression	Dr.Pordel	Cellular and Molecular Immunology	6	
8	June/7	10-12	Antigen processing and presentation to T cells, MHC I pathway, MHC II pathway, Cross presentation, Presentation of non-protein antigens	Dr.Pordel	Cellular and Molecular Immunology	6	
Midterm Exam							
9	Make up	10-12	Circulation of leukocytes in blood vessels, lymphatic vessels and tissues, chemokines and their receptors, adhesion molecules, circulation pathway of naïve lymphocytes, circulation pathway of activated lymphocytes and memory	Dr.Pordel	Cellular and Molecular Immunology	٣	
10	Make up	10-12	Innate immune molecules and receptors, soluble factors of innate immunity (complement and its control pathways,), pattern recognition receptors and their types, inflammasome and its activation mechanisms	Dr.Pordel	Cellular and Molecular Immunology	4	
11	Make up	10-12	Inflammation and Innate Immune Responses, Phagocytosis Mechanisms of Dendritic Cell Types and Their Role in the Immune Response, Monocyte Types and Their Role in the Immune Response, Neutrophil Types and Their Role in the Immune Response, Mechanisms of Inflammation and the Role of Cell Types, Mechanisms of the Immune System to Inhibit and Control Inflammation	Dr.Pordel	Cellular and Molecular Immunology	٤	
12	Make up	10-12	Innate lymphoid cells including NK and their receptors, innate lymphoid cell receptors with emphasis on NK, how antigen is recognized by innate lymphoid cells including NK, including their activation mechanisms and signaling pathways	Dr.Pordel	Cellular and Molecular Immunology	٤	
13	Make	10-12	How antigen recognition and	Dr.Pordel	Cellular and	٧	

	up		activation of B and T lymphocytes: Structure of antigen receptor of T lymphocytes, How antigen recognition and activation of T lymphocytes, Structure of antigen receptor of B lymphocytes, How antigen recognition and activation of B lymphocytes		Molecular Immunology		
14	Make up	10-12	Humoral immune responses, microanatomy and histology of lymph nodes, microanatomy and histology of the spleen with emphasis on the location of different B lymphocyte subtypes	Dr.Pordel	Cellular and Molecular Immunology	12	
15	Make up	10-12	Cellular immune responses, T helper lymphocyte subsets with emphasis on functional and molecular characteristics, the role of 4CD T lymphocytes in the activation and function of 8CD T lymphocytes	Dr.Pordel	Cellular and Molecular Immunology	10,11	
16	Make up	10-12	Immune system of the skin and mucosal surfaces	Dr.Pordel	Cellular and Molecular Immunology	14	