



Hashemite University
Faculty of Pharmaceutical Sciences
Department of Clinical Pharmacy and Pharmacy Practice

Semester: Second

Year: 2020/2021

Course Information	
Course Title	Immunology and Vaccines
Course Number	131702458
Credit Hours	2 credit hours
Prerequisites	131701354

Instructor		
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Course Description
<p>This course focuses on the study of the immune system of humans that has evolved to protect against infection by pathogens. The course will provide a basic understanding of human immunology and its relationship to health and disease. Immunology overlaps with many other biological disciplines including biochemistry, molecular biology, cell biology, genetics, physiology, and microbiology, it relies on methods and concepts derived from these disciplines and in turn makes a major contribution to them.</p> <p>This course aims to teach basic immunology and its role in disease and treatment. It also includes a section on vaccine types and their mechanism of action and a section on pharmacogenomics and drug response based on genetic differences.</p>

Course Objectives
<p>The objectives of this course are:</p> <ol style="list-style-type: none">1. To provide the student with with an appreciation of the basic understanding of human immunology and its relationship to health and disease while providing knowledge of the molecular and cellular basis of the immune system.2. To introduce students to the principals of immunological treatments including anti-inflammatory, anti-cancer, immunosuppressive, vaccines and antigen and antibody-based treatment.

Intended Learning Outcomes
<p>Successful completion of this course should lead to the following learning outcomes:</p> <p>A. Knowledge and Understanding: When students have completed the programme they will have knowledge and understanding of:</p> <p>A1. Student should describe major components and functions of the immune system.</p> <p>A2. Student should understand:</p> <ul style="list-style-type: none">✓ the organs and cells of the immune system✓ antigen and antigen based treatment✓ Principles of Innate Immunity✓ Inflammation, Leukocyte Activation and Migration

- ✓ Tumor Immunology and anti-neoplastic drugs
- ✓ Hypersensitivity and anti-allergic treatment
- ✓ Vaccines: Principles and Practice
- ✓ Transplantation Immunology and immunosuppressive treatment

B. Essential for Practice and Care (Intellectual Skills): When students have completed the course they will be able to:

B1. Become a health care provider who's able to provide patient-centered care as the medication expert of types of currently used vaccines, the differences, and the mechanisms of protection.

B2. Design prevention, intervention, and educational strategies for individuals and communities to manage infectious and inflammatory disease and improve health and wellness related to medications.

C. Approach to Practice Pharmacy: When students have completed the programme they will be able to:

C1. Identify types of current vaccines; explore and prioritize potential strategies; design, implement, and evaluate a viable solution related drug regimens. **(Problem solver)**

C2. Patient Advocacy (**Advocate**) - Assure that patients' best interests regarding vaccines.

C3. Educator (**Educator**) - Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding regarding various vaccines and anti-inflammatory drugs.

C4. Communication (**Communicator**) - Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization regarding various related-medications and vaccines

C5. (Collaborator) - Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs

D. Personal and Professional Development: When students have completed the course they will be able to:

D1. The student should be able to elaborate the concept of immunology and immunotherapy.

D2. Self-awareness (Self-aware) - Examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth regarding his role as a pharmacist, the medication expert and health care provider concerning the current vaccines.

D3. Professionalism (Professional) - Exhibit behaviours and values that are consistent with the trust given to the profession of pharmacy by patients, other healthcare providers, and society.

Reading List

1. (textbook)	Advanced Concepts in Human Immunology: Prospects for Disease Control, Pooja Jain Lishomwa C. Ndhlovu <i>Editors</i> , 2020
2.	- Basic Immunology, Abbas and Lichtman, Latest Edition
3.	- Essentials of Clinical Immunology, Chapel & Haeney, Latest Edition
4.	- Basic Principles of Immunology, Kayser, Latest Edition

Topics	Topic Details	Reference No.	Assessment methods
Introduction, History, Organs and Cells of the Immune System	-Definition of Immunology -Importance of Immunology -Historical background of Immunology -Modern Immunology -Outline the major principles of the human immune response (innate immunity, humoral immunity, and adaptive immunity)	1	First Exam
Antigen Structure, Processing and Presentation	-Definition of antigens and epitopes -Types and sources of antigens -Antigen processing and presentation -The roles of Major Histocompatibility Complex (MHC) -Discuss the role of antigen presentation in generating immunity	1	First Exam

Antibodies Structure and Function	<ul style="list-style-type: none"> -Immunoglobulin structure and binding site/s -Immunoglobulin classes and their characteristics -the role of Immunoglobulins in neutralization, opsonisation, antibody-dependent cellular cytotoxicity (ADCC), complement and mucosal immunity -Introduction to artificial antibodies including monoclonal and polyclonal antibodies 	1	First Exam
Antigen Antibody Reaction	<ul style="list-style-type: none"> -Discussion of general principles of antigen-antibody interactions -Definition and importance of affinity, avidity, and cross reactivity -Laboratory methods used for visualizing antigen-Antibody Reactions 		First Exam
Innate Immunity	<ul style="list-style-type: none"> -Discuss the concept of innate immunity - features, importance. -Explain how the innate immune system recognizes foreign antigens in general. -Outline the components of the innate immune system. -Discuss how these components combat various foreign antigens 	1	Second exam
Inflammation and leukocyte migration	<ul style="list-style-type: none"> -Overview of the inflammatory process: initiation, inflammation, resolution, benefits and liabilities -Major constituents -Clinically relevant inflammatory processes -Control of inflammation 	1	Second exam
Adaptive Immunity	<ul style="list-style-type: none"> -Humoral immunity -Cellular immunity 	1	Second exam
Cytokines	<ul style="list-style-type: none"> -Definition and general properties of cytokines -Classification of cytokines -Cytokine receptor -Biological functions of cytokines -Cytokine and disease 	1	Second exam
Tolerance and Autoimmunity	<ul style="list-style-type: none"> -Define and discuss the general characteristics of tolerance -Define the main factors that influence the development of tolerance -Identify the main mechanisms of tolerance induction in B and T cells -Identify the mechanisms involved in the development of autoimmunity -Approach to treatment of autoimmune diseases 	1	Final exam
Tumor immunology	<ul style="list-style-type: none"> -Introduction to tumours types and aetiology -Tumours associated antigens and markers -Evidence for Immune Reactivity to Tumors -Discuss immune protection against tumours and immune surveillance system -Discuss immune mediated tumour growth -Provide an overview of experimental cancer therapies 	1	Final exam

Immune Deficient Diseases	<ul style="list-style-type: none"> -Outlines different types of autoimmune deficiencies -Differentiates primary and secondary autoimmune deficiencies -Discuss the common characteristics and the major clinical diseases of <ol style="list-style-type: none"> 1. B cell deficiency 2. T cell deficiency 3. Combined deficiency 4. Phagocytic deficiency 5. Complement deficiency 	1	Final exam
Human Immunodeficiency Virus (HIV)	<ul style="list-style-type: none"> -Morphology -Types of HIV -Origins of HIV -Epidemiology -Transmission -Pathogenesis and Virulence Factors -Clinical Manifestations -Laboratory Tests -Treatment 	1	Final exam
Immunization	<ul style="list-style-type: none"> -Differentiates active and passive immunity -To understand the types of currently used vaccines, the differences, and the mechanisms of protection -Vaccination scheme, routes of administration, and common side effects -To understand how to develop a vaccine and the general requirements for vaccine development and adjuvants -To understand the new concept of vaccines against non-microbes such as self or tumour molecules 	1	Final exam

Grade Distribution		
Assessment	Grade	Date
- First Exam	30%	To be assigned later
- Second Exam	30%	To be assigned later
- Final Exam	40%	To be assigned later

Important regulations

- ◆ On average, students need to 5 hours of study and preparation weekly.
- ◆ Excellent attendance is expected. According to the university policy, students who miss more than 15% of the lecture hours with or without excuse will be dismissed from the course
- ◆ At the beginning of the lectures, be on time and don't leave before the end of the lecture without an accepted excuse
- ◆ If you missed a class, it is your responsibility to find out about any announcements or assignments you have missed
- ◆ For any clarification, please communicate your instructor at his posted office hours or by appointment
- ◆ Switch off your mobile or keep it silent throughout the lecture
- ◆ Listen well to the lecture and avoid side discussions, if you have a question, ask your instructor and not your colleague
- ◆ If you have any information, document your reference, if you didn't, then you broke the intellectual property rights law and the law will be applied
 - For more informations, visit the website:
 - <http://www.plagiarism.org/>
- ◆ Exams are scheduled to be given three times throughout the semester, your are expected to attend all. If not, make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.
- ◆ Cheating, academic diconduct, fabrication and plagiarism will not be tolerated, and the university policy will be applied

Last updated on 25/2/ 2022 by : Dr. Muna Oqal