

Module (Course Syllabus) Catalogue 2022-2023

College/ Institute	Shaqlawa Technical College	
Department	Veterinary Technic	
Module Name	Immunology	
Module Code		
Degree	Technical Diploma <input checked="" type="checkbox"/>	Bachler <input checked="" type="checkbox"/>
	High Diploma <input type="checkbox"/>	Master <input type="checkbox"/> PhD <input type="checkbox"/>
Semester	4	
Qualification	Technical Diploma Student	
Scientific Title	NA	
ECTS (Credits)	5	
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/> Assist. <input type="checkbox"/>
Weekly hours	4	
Weekly hours (Theory)	(2)hr Class	(125)Total hrs Workload
Weekly hours (Practical)	(2)hr Class	(125)Total hrs Workload
Number of Weeks	14	
Lecturer (Theory)	Dr. Muayad A. Mahmud	
E-Mail & Mobile NO.	muayad.mahmud@epu.edu.iq 07504773872	
Lecturer (Practical)	Dr. Muayad A. Mahmud	
E-Mail & Mobile NO.	muayad.mahmud@epu.edu.iq	
Websites		

Course Book

Course Description	<p>The immunity includes our biological ability to defend (by eliminating, controlling and/or slowing down) the attack of pathogens and disease causing agents via blocking, identifying and destroying the components of invaders.</p> <p>This course is designed to make our MLT students (Shaqlawa T. College) familiar with the principle concerns of the defense system of human body, its elements, its functions and the way it works. This will include describing types of immunity, associates cell types and tissues, immunological sensors and responses, its activation and suppression, immunological disorders and immunotherapy ... etc</p>
Course objectives	<p>This course will describe the immune systems of vertebrates that enable them to recognize and respond specifically to foreign substances. The molecular and cellular basis of immunity will be emphasized. The roles of antigens, antibodies and immunocompetent cells in pathogenesis and immunity to infectious diseases will be covered. Specific topics include antigens and antigenic determinants, antigen-antibody reactions, antibody structure and formation, anatomy and physiology of immunocompetent tissues, cellular immune responses, the complement system and other immune modulators, phagocytosis, monoclonal antibody formation, immunogenetics and the histocompatibility antigens, diseases of the immune system and immunopathology, tolerance, inflammation, allergies, and hypersensitivity reactions. The applications of immunology in the design of vaccines, immunotherapeutics, immunodiagnostics, and organ transplantation will be discussed, as will the uses of immunology in biological research.</p>

<p>Student's obligation</p>	<p>*Exam policy: Student Should take 2 exams during the course There will be no make-up exams for absences students without medical report. Other activities such as Seminars, Reports and Home works are compulsory</p> <p>*Classroom polices:</p> <p>1- Attendance: You are strongly encouraged to attend class on a regular basis, as participation is important to your understanding of the material. This is your opportunity to ask questions. You are responsible for obtaining any information you miss due to absence</p> <p>2- Lateness: Lateness to class is disruptive</p> <p>3- Electronic devices: All cell phones are to be turned off at the beginning of class and put away during the entire class.</p> <p>4-Talking: During class please refrain from side conversations. These can be disruptive to your fellow students and your professor</p> <p>5- No Disrespectful to both the professor and to your fellow students.</p>			
<p>Required Learning Materials</p>	<p>Face-to-Face (Lectures and PowerPoint presentation), white-board and online meeting using Zoom us app.</p> <p>Practical lessons by working in the Lab and performing experiments. Lecture handouts will be available on Moodle plat form and online access will always be possible until final exam time.</p>			
<p>Evaluation</p>	<p>Task</p>	<p>Weight (Marks)</p>	<p>Due Week</p>	<p>Relevant Learning Outcome</p>
	<p>Paper Review</p>			
	<p>Assignments</p>	<p>Homework</p>	<p>5%</p>	
		<p>Class Activity</p>	<p>2%</p>	
		<p>Report</p>	<p>10%</p>	
		<p>Seminar</p>		
		<p>Essay</p>		
	<p>Project</p>			
	<p>Quiz</p>	<p>8%</p>		
	<p>Lab. Report and activity</p>	<p>10%</p>		
	<p>Midterm Exam</p>	<p>25% (T:10, P:15)</p>		
	<p>Final Exam</p>	<p>40% (T:20, P:20)</p>		
	<p>Total</p>	<p>100</p>		
<p>Specific learning outcome:</p>	<p>After completion of this course, you will be able to:</p> <ul style="list-style-type: none"> Define Basic Immunology (Immunology-Hematopoiesis-Localization of hematopoiesis), Innate Immunity (Innate immunity- 			

	<p>Factor influencing level of innate immunity-Mechanism of innate immunity-Humoral factor-Cellular factor-Mode of intracellular killing), and Acquired Immunity (Acquired Immunity-Active immunity-Passive immunity-Difference between active and passive immunity).</p> <ul style="list-style-type: none"> • Localization of the immune system in the body and Lymphoid Organ [Lymphoid Organ-A/Primary lymphoid tissue(Bone marrow-Bursa of fabricius-Thymus) B-Secondary lymphoid tissue (Lymphatic circulation-Lymph node-Spleen) C/Tertiary lymphoid tissue (Mucosal associated lymphoid tissue-Intraepithelial lymphocyte) • Different structure and shape of immunoglobulin (Structure of Ig-Type of Ig-Function of Ig) • Properties of the immunogen-Antigen presenting cell-Ag processing pathway • Mechanism of immune response-Primary and secondary immune response. 	
Course References:	<p>Text Book: Kuby Immunology (7th, Seventh Edition) - By Owen, Punt, & Stranford by Judy Owen / Jenni Punt / Sharon Stranford (2013)</p> <p>Essential Clinical Immunology Edited by John B. Zabriskie. The Rockefeller UniversityBrooks (2009)</p> <p>G.F., Carroll, K.C., Butel, J.S. &Morse, S.A. (2007) Medical Microbiology (24th Ed.) NY, McGraw Hill.</p>	
Course topics (Theory)	Week	Learning Outcome
Immunity : Innate immunity Adaptive immunity	Week 1	Students will be familiarized with the course syllabus and the expected learning outcomes
Cellular basis of the immune response and immune organs	Week2	Primary lymphoid organs: These organs include the bone marrow and the thymus. They create special immune system cells called lymphocytes. Secondary lymphoid organs: These organs include the lymph nodes, the spleen, the tonsils and certain tissue in various mucous membrane layers in the body (for instance in the bowel).
Cytokines	Week 3	General characteristics, types and functions of cytokines
Antibody and Antigen	Week 4	General characteristics, types and functions of Antibody and Antigen
Humoral immunity	Week 5	Which is an example of humoral immunity?

		<p>What is humoral immunity vs cell-mediated immunity?</p> <p>What is humoral immunity and how does it work?</p> <p>What are the two types of humoral immunity?</p>
Cell –mediated immunity	Week 6	<p>What is an example of cell-mediated immunity?</p> <p>What are the two types of cell-mediated immunity?</p> <p>What is humoral and cell-mediated immunity?</p> <p>What are the steps of cell-mediated immunity?</p>
Complement system	Week 7	<p>What is an example of complement system?</p> <p>What are the 3 complement pathways?</p> <p>What are the 4 functions of complement?</p> <p>Where is the complement system?</p>
Antigen-antibody reactions in the laboratory	Week 8	<p>What are the examples of antigen-antibody reaction?</p> <p>Which are the steps in the process of antigen-antibody reaction?</p> <p>What laboratory department studies antigen-antibody reactions?</p> <p>What are the 3 ways antibodies react to antigens?</p>
Tolerance and Autoimmune Disease	Week 9	<p>What does tolerance mean in autoimmunity?</p> <p>How autoimmune disease breaks tolerance?</p> <p>What events can result in the loss of self tolerance and autoimmune disease?</p> <p>What diseases result from failures of self tolerance?</p>
Hypersensitivity (Allergy)	Week 10	<p>What are the 4 types of hypersensitivity reactions?</p> <p>What causes allergic hypersensitivity?</p> <p>What is difference between allergy and hypersensitivity?</p>

		Which type of hypersensitivity causes allergies?
Immunodeficiency	Week 11	What is an example of an immunodeficiency disease? What are 3 possible reasons for immunodeficiency? What is the most common type of immunodeficiency? What are the two types of immunodeficiency?
Tumor Immunity	Week 12	What cells are important for tumor immunity? How does the immune system fight tumors? What is tumor immune evasion?
Hypersensitivity (Anaphylactic hypersensitivity- Type 2 hypersensitivity-Immune complex hypersensitivity-Delayed hypersensitivity).	Week 13	Is anaphylaxis a Type 2 hypersensitivity? What are the 4 types of hypersensitivity? What type of hypersensitivity is anaphylaxis? What is Type 2 hypersensitivity?
Practical Topics	Week	Learning Outcome
The Immune System Organs and Cells (Histology and Anatomy)	Lab1	What are the cells and organs of immune system? What is immune system histology? What are the organs of the immune system? What are the 7 parts of the immune system?
Agglutination Reactions I	Lab2	What is agglutination reaction with example? What are the types of agglutination reactions? What is an agglutination reaction caused by? What are the stages of agglutination reaction?
Agglutination Reactions II	Lab3	What is agglutination reaction with example? What are the 2 steps of agglutination?

Protein Electrophoresis (Serum Protein Electrophoresis)	Lab4	Serum protein electrophoresis uses in identifying patients with multiple myeloma and other serum protein disorders. How Electrophoresis separates proteins?
Enzyme Linked Immunosorbent Assay (ELISA).	Lab5	What is enzyme-linked immunosorbent assay ELISA used for? How does ELISA work as immunosorbent assay? What is the Elisa test and how does it work? What is the Elisa test used to diagnose?
Double Immunodiffusion (Ouchterlony)	Lab6	What is Ouchterlony double diffusion test? What does Ouchterlony test for? What do you mean by double immunodiffusion? What is double diffusion test?
Isolation of Peripheral Blood Mononuclear Cells	Lab7	How do you isolate mononuclear cells from peripheral blood? Why is it important to isolate the peripheral blood mononuclear cells? What are human peripheral blood mononuclear cells?
Mixed Lymphocyte Reaction	Lab8	Why are mixed lymphocyte reactions performed? How does an MLR assay work? What is allogeneic MLR? What is T cell activation?
Flow Cytometry	Lab9	What is flow cytometry and how does it work? What are the 3 main components of flow cytometry? What is a flow cytometry analysis? What is the basic principle of flow cytometry?
Monoclonal Antibody Technology	Lab10	What are monoclonal antibodies and how do they work? Which technique is used for monoclonal antibodies? What are monoclonal antibodies examples?

Question Sample:

Q1. Matching

- | | |
|--|----------------------|
| 1. Natural immunity, the first line of defense against foreign organisms and substances. J | a. Antigen |
| 2. Skin and mucosal linings of respiratory and gastrointestinal tract. E | b. Adaptive immunity |
| 3. Tears and saliva contain this enzyme that kills bacteria by breaking the peptidoglycan layer of cell walls. F | c. Cytokines |
| 4. Host cell engulfs and destroys the foreign organism. G | d. Complement |
| 5. White cells in the blood; nucleated cells originated from bone marrow. H | e. Physical barriers |
| 6. A group of plasma and cell surface proteins that fights invading organisms. D | f. Lysozyme |
| 7. Secretory proteins produced by lymphocytes and monocytes in response to microbial antigens; help cell- to-cell communication, inflammatory reactions, immune response reactions. C | g. Phagocytosis |
| 8. Response to antigen. I | h. Neutrophils |
| 9. Second line of defense; develops memory for subsequent exposure to the previously encountered organisms. B | i. Antibody |
| 10. Foreign microbial and non-microbial substances. A | j. Innate Immunity |

Q2/ Multiple Choice

1. Which of the following does not protect body surfaces:
 - a. Skin
 - b. Salivary amylase
 - c. Gastric acid
 - d. Gut microflora

2. The initiation of T cell responses requires multiple receptors on the T cells recognizing ligands on APCs. The MHC molecule located around the peptide-binding cleft is recognized by the:
 - a. B cells
 - b. CD4 or CD8 molecules
 - c. NK cells
 - d. CD3 or CD6 molecules

3. Neutrophil defensins are:
 - a. Anti-toxins.
 - b. Enzymes.
 - c. Oxygen-dependent.
 - d. Peptide antibiotics.

4. Acute inflammation characteristically involves:
 - a. Influx of macrophages
 - b. Influx of mast cells
 - c. Influx of neutrophils
 - d. Influx of antibodies

5. Lysozyme:
 - a. Splits the peptidoglycan of bacterial cell walls.
 - b. Is a cytoplasmic organelle
 - c. Is released by mast cells.
 - d. Activates complement.

Q3/

Short Answer Define function/role of the following cells of the immune system.

1. Basophil

Basophils originate from hematopoietic stem cell appear in many specific kinds of inflammatory reactions, particularly those that cause allergic symptoms. Basophils are a type of white blood cell called a granulocyte which cells contain granules that they use to secrete important substances. The granules inside basophils contain heparin, histamine, and other molecules that play a role in inflammation. Basophils contain anticoagulant heparin, which prevents blood from clotting too quickly. They also contain the vasodilator histamine, which promotes blood flow to tissues.

2. Eosinophil

Eosinophils are pleiotropic multi-functional leukocytes that are typically associated with the initiation and propagation of inflammatory responses, particularly helminth infection and allergic disease.

3. Neutrophil

A type of immune cell that is one of the first cell types to travel to the site of an infection. Neutrophils help fight infection by ingesting microorganisms and releasing enzymes that kill the microorganisms. A neutrophil is a type of white blood cell, a type of granulocyte, and a type of phagocyte.

4. Lymphocyte

A type of immune cell that is made in the bone marrow and is found in the blood and in lymph tissue. The two main types of

lymphocytes are B lymphocytes and T lymphocytes. B lymphocytes make antibodies, and T lymphocytes help kill tumor cells and help control immune responses. A lymphocyte is a type of white blood cell

5. Monocyte

A type of immune cell that is made in the bone marrow and travels through the blood to tissues in the body where it becomes a macrophage. Macrophages surround and kill microorganisms, ingest foreign material, remove dead cells, and boost immune responses. A monocyte is a type of white blood cell and a type of phagocyte.

Extra notes:

External Evaluator