



Course Specifications

Course Title:	Virology and Immunology
Course Code:	425BIO-3
Program:	Biology
Department:	Biology
College:	College of Arts and Sciences
Institution:	Najran University

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A. Course Identification

1. Credit hours: 3
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: VIII/ 4 th year
4. Pre-requisites for this course (if any): non
5. Co-requisites for this course (if any): non

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	Blended		
3	E-learning		
4	Correspondence		
5	Other	-	

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	45
2	Laboratory/Studio	-
3	Tutorial	-
4	Others (specify) E-learning	
	Total	45
Other Learning Hours*		
1	Study	32
2	Assignments	3
3	Library	5
4	Projects/Research Essays/Theses	5
5	Others (specify) : Office hours	10
	Total	55

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course covers an introduction to the field of virology, including, virus structure, virus classification and replication, laboratory diagnosis of virus, how viruses enter and spread in the host cells, and host resistance to viruses. The course also provide the student with basic comprehensive study of the immune system and immune response to different pathogens, structure and function of immune cells. Collaboration of immune system components to defeat different pathogens. In addition, some immunological techniques, including immunization methods, serum and plasma preparation and different immunological assays

2. Course Main Objective

1. Describe the nature and basic structure of viruses
2. State the characteristics used to classify viruses and their taxonomic groups
3. Identify the economic importance of animal and plant viruses.
4. Identify the cells and organs of the immune system and their roles.
5. Understand immune effector mechanisms and their consequences.
6. Explain viral replication and methods for viral isolation and purification.
7. Differentiate between the major host defense mechanisms.
8. Evaluate the generation of a specific immune response against pathogen, including the roles of B and T-cells and their products.
9. Discuss different techniques for the detection of antigen-antibody interaction.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge:	
1.1	Identify the economic importance of animal and plant viruses.	
1.2	Recognize the cells and organs of the immune system and their roles.	
1.3	Know immune effector mechanisms and their consequences.	
2	Skills :	
2.1	Describe immune effector mechanisms and their consequences.	
2.2	Differentiate between the major defense mechanisms.	
2.3	Discuss different techniques for the detection of antigen-antibody interaction.	
3	Competence:	
3.1	Work independently and as a team work	
3.2	Manage recourses, time and other members of the group	
3.3	Communicate results of work with others	

C. Course Content: Theoretical Aspect

No	List of Topics	Contact Hours
1	General Virology <ul style="list-style-type: none"> - Nomenclature, properties, morphology and ultra-structure of viruses. - classification of viruses - Capsids and their arrangements - Types and structures of viral envelopes. - Viral genome composition. 	3
2	Bacterial Viruses Bacteriophage structure., Life cycle. Bacteriophage typing, Application in bacterial genetics.	3
3	Plant Viruses <ul style="list-style-type: none"> - Classification and nomenclature. Effects of viruses on plants; appearance of plants. 	3

	Common virus diseases of plants. Life cycle and type species of plant viruses. Transmission of plant viruses with and without vectors. Seed stocks and diseased plants (seed morphology, seedling symptomatology, indicator plants, serological methods, histochemical tests and fluorescent microscopy). Prevention of crop loss due to virus	
4	Animal Viruses <ul style="list-style-type: none"> - Classification and nomenclature of animal human viruses- Epidemiology, lifecycle, pathogenicity. - Examples of certain important viral disease - Prevention and treatment of RNA and DNA viruses. Viral vaccines, interferon and antiviral drugs.	6
5	General Methods of Diagnosis and Serology <ul style="list-style-type: none"> - Cultivation of viruses in embryonated eggs,- Experimental animals, and cell cultures; Primary and secondary cell cultures; Suspension and monolayer cell cultures; Cell lines and transgenic systems; - Notes on Serological methods Haemagglutination and HAI; Complement fixation- Immunofluorescence methods- ELISA and Radioimmunoassays; Assay of viruses <ul style="list-style-type: none"> - physical and chemical properties of virus - radioactivity tracers, electron microscopy - Infectivity assay (plaque method, end point method) - Infectivity assay of plant viruses.	6
6	Organs of the immune system: - Brief description of cells and organs of the immune system. <ul style="list-style-type: none"> - Primary and lymphoid organs. - Histological structure and function of lymphoid organs. - Lymphocyte recirculation. - Cells of the immune system and their origin. 	6
7	Innate immunity: <ul style="list-style-type: none"> - Mechanical barriers- Physical barriers- Chemical barriers- Cellular barriers. Inflammation	3
8	Acquired immunity: <ul style="list-style-type: none"> - Components of acquired immunity. - different acquired immune responses. - Definition of pathogens and types of antigens and antigenic determinants. 	3
9	Molecules of the immune system: <ul style="list-style-type: none"> - Antibody types, structure and function. - Structure and function of the T cell receptor CD3 complex. - Structure and function of major histocompatibility complex (MHC). - Exogenous and endogenous antigen presentation - Cytokines and adhesion molecules. - Classical pathway of complement activation. 	6
10	Immune response against virus, bacteria and parasites- Mechanism of T and B cells activation	6
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge:		
1.1	Identify the economic importance of animal and plant viruses.	Lectures	Final and semester exams
1.2	Recognize the cells and organs of the immune system and their roles.	Lectures	Final and semester exams

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.3	Describe immune effector mechanisms and their consequences.	Lectures	Final and semester exams
2.0	Skills :		
2.1	Understand immune effector mechanisms and their consequences.	Student negotiations	Class room activity
2.2	Differentiate between the major defense mechanisms.	Student negotiations	Class room activity
2.3	Discuss different techniques for the detection of antigen-antibody interaction.	Student negotiations	Class room activity
3.0	Competence:		
3.1	Work independently and as a team work	Student negotiations	Class room activity
3.2	Manage recourses, time and other members of the group	Student negotiations	Class room activity
3.3	Communicate results of work with others	Student negotiations	Class room activity

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
2	Theoretical First Exam	6	20%
	Theoretical Second Exam	12	20%
	Assays, presentations, homework.....etc.	contiguous	10%
5	Theoretical Final Exam	15	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- 10 hours per week as office hours
- Academic advisor 10 hours per week

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	- Principles of Virology: 2004. 2nd ed. S. J. Flint, et al. ASM Press. - Plant virology 3rd edition. R.E.F., Matthews (2006). Roitt and Delves – 2001- Essential Immunology 10th Edition – Blackwell Science Ltd Publishers
Essential References Materials	John B. Carter, Venetia A. Saunders, (2007) Virology: principles and applications .John Wiley and Sons– 358 pages
Electronic Materials	http://microbiology.columbia.edu/virology.html http://www.immunologylink.com/ http://www.roitt.com/
Other Learning Materials	Films and videos related to the course topics

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) 40 seats/ class room Computer access with data show and internet
Technology Resources (AV, data show, Smart Board, software,	Data show, Overhead projector
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Models Microscopes

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Course evaluation	Student	direct
Student-faculty meeting	Faculty, Program Leaders	indirect
Departmental council discussions	Staff members	indirect
Discussion with the group of faculty teaching the same course	Peer Reviewer	indirect
Periodical departmental revisions of each method of teaching	Peer Reviewer	indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	