Course Specification
(Bachelor)

Course Title:	Virology
Course Code:	BIOL 334
Program:	Biology
Department:	Biology
College:	College of Science-Al Zulfi
Institution:	Majmaah University
Version:	3
Last Revision Date:	29/12/23

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 2(2+0)					
) (Equivalent to ECTS Credit Point: 3)					
2. Course type					
A.	☒ University	☒ College	☒ Department	☐Track	☐Others
B.	☐Required		☐Elective		
3. Level/year at which this course is offered: 6th Level/ 3rd Year					
4. Course General Description:					
The course provides the knowledge about variable DNA, RNA viruses, Viroid's, and prions to the students in general biology. The viruses are associated with many emerging infectious disease to both animals and plants. At present, some of the viral diseases do not have treatment modalities, antivirals, or vaccines to control the disease. Therefore, the course is designed and intended cover an introduction and fundamentals of virology including, virus structure, nomenclature, classification, replication, mode of transmission, infection, epidemiology, diagnosis, infection control, immunization and prevention.					
5. Pre-requirements for this course (if any): General Microbiology: BIOL 231					
6. Co-requisites for this course (if any): Nil					
7. Course Main Objective(s):					
The student should develop the ability to: • Review the history and principles of virology. • List the general properties of viruses • Write the different types of DNA and RNA viruses • Various structures of viruses. • Differentiate between viruses and other microorganisms. • State the characteristics used to classify viruses. • List the taxonomic groups of viruses. • Describe the process of viral replication and reproduction. • Summarize the common plants virus diseases. • Describe the symptom infection by some human viruses • Know the mode of viral spread and their control measures. • Summarize the different methods for isolation and purification of viruses					

- Know the antiviral agents and vaccines.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	83%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning	06	17%
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		30

Workload (based on the academic semester)

No	Activity	Contact Hours
1.	Contact hours	30
2.	Self-study hours or Academic learning hours (Assignment, Quizzes, Reports, Discussions, Library, Research, ...)	30
	Workload	60 Hours
	Equivalent to ECTS Credit points	3

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding (K2)			
1.1	Identify the characteristics of viruses and components of mature viruses responsible for viral diseases -Introduction	K2	Lectures, Presentations Individual and group discussion	Quizzes, Midterm and final exams
…				
2.0	Skills (S3)			
2.1	Illustrate classification of virus, transcription and translation. Analyze general viral diagnosis methods and therapeutic options	S3	Lectures, Presentations Individual and group discussion	Quizzes, Midterm and final exams
3.0	Values, autonomy, and responsibility (V2)			
3.1	Developing the student's ability to deal with multimedia and take the appropriate decision and take responsibility about its consequences, and also collaboration with colleagues to work more effectively and to develop the spirit of team work	V2	Individual and group discussion.	Assignment Homework and Oral presentation on specific viral diseases
...				

C. Course Content

No	List of Topics	Contact Hours
1.	**Unit:1 Introduction to Virology** • Definition for viruses and brief introduction on discovery of viruses • Characteristics of viruses • Comparison to bacteria • Components of mature viruses • Basic structure of a virus and bacteriophage • Nucleocapsid morphology • Classification viruses • Viral genome and multiplication methods • Host range and viral specificity	6

	• Viruses and diseases • Pathogenic/ oncogenic DNA and RNA viruses • Sub viruses: Viroids and Prions • Diagnostic methods Antivirals and Vaccines	
2.	**Unit:2 Classification of Viruses and nomenclature** • Nomenclature of viruses • Classification of virus – ICTV, Baltimore Classification • 3. Baltimore Classification – 7 classes • Classification based Host range and target cell specificity • Classification of Viruses based on the viral diseases as per the Baltimore classification. • Classification of sub viruses	4
3.	**Unit:3 Molecular Mechanisms of viral Replication** • Viral replication and stages • Transcription and Translation • Transcription Group-I dsDNA viruses • Transcription Group-II ssDNA viruses • Transcription Group-III dsRNA viruses • Transcription Group-IV (+) ssRNA viruses • Transcription Group-V (-) ssRNA viruses • Transcription Group-VI ssRNA-RT viruses • Transcription Group-VII dsDNA RT viruses • Lytic and Lysogenic cycle • Difference in Lytic and Lysogenic cycle	4
4.	**Unit: 4 Bacteriophage** • Discovery of Bacteriophage • Characteristics of bacteriophages • Common structure • Life cycles of bacteriophages • Pseudolysogeny • **Bacteriophage and Its research applications** ❖ Bacteriophage and Human Health ❖ Role in Laboratory research ❖ Limitations of phage therapy ❖ Application in food industry	4
5.	**Unit: 5 Corona Virus (A systematic study)** • Introduction to Coronaviruses • Molecular Structure • Classification • Corona outbreaks • Mode of viral host entry • Present outbreak and Pandemic condition	4

	• Mode of spread • Signs and symptoms • Preventive methodologies • Protocol to quarantine • Possible susceptible hosts	
6.	**Unit: 6, Plant viruses** • General Properties of plant viruses • Classification and nomenclature. • Effects of viruses on plants; appearance of plants • Histology, physiology and cytology of infected plants • Common virus diseases of plants • Life cycle and type species of plant viruses • Prevention of crop loss due to virus infection	4
7.	**Unit: 7, General Viral Diagnosis methods and therapeutic options** • **Electron Microscopy** (SEM and TEM) • **Immunologic Assays** (ELISA and Western Bloting) • **Biological assays:** Detect cytopathic effects (CPE) caused by viral infection of cells. I. Plaque assays for lytic viruses II. Focus formation for transforming oncogenic viruses • **Hemagglutination Assay** • **Molecular assays:** I. PCR (Polymerase chain reaction) II. Southern (DNA) or Northern (RNA) • **Antiviral agents** • **Viral vaccines**	4
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	**Quiz's, Assignments, Homework**	**Once every 2 weeks once on as applicable**	**10%**
2.	**Mid-term Exam -1**	**5th week**	**15%**
3.	**Mid-term Exam -2**	**9th week**	**15%**
4.	**Black Board, e-Exam**	**12th week**	**20%**
5.	**Final Exam**	**18th week**	**40%**
	Total		**100%**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

A. E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Principles of Virology (2nd edition), S.J. Flint, L.W. Enquist, V.R. Racaniello, A.M. Skalka. ISBN: 1-55581-259-7 Plant Virology (5th edition), R. Hull. 9780123848710 – 9780123848727 Viruses of Microorganisms, Paul Hyman and Stephen T. Abedon. 978-1-910190-85-2
Supportive References	Introduction to Modern Virology (6th edition), N. J. Dimmock, A.J. Easton and K. N. Leppard. Principles of Molecular Virology (4th edition), Alan J. Cann
Electronic Materials	• http://www.virology.net/Tutorials.html • http://www.virology.net/garryfavweb10.html • https://guides.lib.umich.edu/c.php?g=282840&p=1884666 • https://virologyj.biomedcentral.com/articles/10.1186/s12985-020-1291-9 • https://www.wikiwand.com/pt/V%C3%ADrus
Other Learning Materials	Computer-based programs with professional standards or and virtual software's

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Existing facilities are satisfactory
Technology equipment (projector, smart board, software)	Existing facilities are satisfactory
Other equipment (depending on the nature of the specialty)	Nil

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect assessment
Effectiveness of students assessment	Program leader	Direct assessment
Quality of learning resources	Students	Indirect assessment
The extent to which CLOs have been achieved	Faculty	Direct assessment
Other: Nil		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Department of Biology Council
REFERENCE NO.	7
DATE	04/04/1446 (07/10/2024)