هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission
اعتماد
NCAAA
2024
TP-153

Course Specification
(Bachelor)

Course Title:	Virology
Course Code:	BIO 1345
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Al-Imam Mohammad Ibn Saud Islamic University
Version:	*Course Specification Version Number*
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: 4 (3 Lectures + 2 Laboratory + Tutorials)					
2. Course type					
A.	☐ University	☐ College	☒ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: Level 6 / Third Year					
4. Course General Description:					
Viruses have been shown to infect all forms of life, and this course provides the fundamental background for studying the way in which viruses interact with their hosts. Surprisingly, these interactions may be beneficial as well as deleterious. The course will cover both sides of this dynamic interplay including virus disease in humans, animals and plants as well as molecular aspects of the nature of viruses, their evolution, replication, applications in genetic engineering and gene therapy, detection and control by both vaccines and antiviral strategies. The course will familiarize students with practical skills relevant to the isolation, purification and characterization of animal and plant viruses. These include tissue culture techniques and virus growth, as well as molecular aspects of the detection and study of viral genes and expressed proteins, and the application of virus vectors in cell biology and biotechnology.					
5. Pre-requirements for this course (if any):					
General Bacteriology – BIO 242					
6. Co-requisites for this course (if any):					
None					
7. Course Main Objective(s):					
By the end of this course the student will be able: • To have the scientific background about virus structure and replication, their pathogenesis, host immune responses against them, and their control. • To know how to deal with samples containing viral particles, the method used for virus isolation. • To deal with the common viral diseases that affect animal and poultry flocks, regarding laboratory diagnosis, prevention and control. • To recognize the multiplicity of virus transmission factors. • To compare human diseases, animals and plants by viruses. • To clarify the role of viruses in transforming normal cells into cancerous. • To remember the role of viruses in the vaccination and immunization.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	36
2.	**Laboratory/Studio**	24
3.	**Field**	0
4.	**Tutorial**	0
5.	**Others (specify)**	
Total		60

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

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	To define the Introduction, structure and methods of multiplication of viruses.	1.1-1.2	Interactive lectures.	•Written tests. •Oral tests.
1.2	To outline the virus classification, transmission and spread of viruses in host.	1.1-1.2	Panel of discussions and dialogue, including discussion of small groups	•Classroom assignments. •Home assignments.
2.0	**Skills**			
2.1	To reconstruct information about the functions of the organs	2.2	•Mental focus.	•Performance of written tests.

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	and arrange them logically and sequentially.		•Problem-solving and decision-making, Survey / discovery	•Identification tests.
2.2	To explain and identify the relationship between cause and consequence in the different mechanisms.	2.1	Reciprocal teaching.	Research papers.
2.3	To analyze data and information and view discussion of sound scientific debate.	2.2	Style – Wiki.	Bags achievement – portfolio.
3.0	**Values, autonomy, and responsibility**			
3.1	To appraise collaborative work skill.	3.1-3.2	Encourage students to work cooperatively during tutorials, class presentaions and laboratory classes. Laboratory reports writing.	Indivisual and group presentations. Virtual labs. Laboratory performance and reports.
3.2	To interpret linking between science and technology with society.	3.2-3.3		Virtual labs. Lab reports.
3.3	To manipulate the operation and use of computers and means of modern technology.	3.1		Assignments. Topic presentations.

C. Course Content

No	List of Topics	Contact Hours
1.	• Introduction • Discovery of viruses, nature and definition of viruses, general properties of viruses. • Concept of viroids, virusoids, satellite viruses and prions. Theories of viral origin.	3
2.	• Structure of viruses. • Capsid symmetry, enveloped and non-enveloped viruses. • Isolation, purification and cultivation of viruses.	3
3.	• Viral Taxonomy. • Classification and nomenclature of different groups of viruses infecting microbes, plants and animals.	6
4.	• Salient features of viral genomes.	9

	• Unusual bases (TMV, T4 phage), overlapping genes (ΦX174, Hepatitis B virus). • Alternate splicing (Picornavirus), terminal redundancy (T4 phage), and terminal cohesive. • Ends (lambda phage), ambiences genomes (arena virus), partial double stranded. • Genomes (Hepatitis B), long terminal repeats (retrovirus), segmented (influenza). • Virus and non-segmented genomes (picornavirus), capping and tailing (TMV).	
5.	• Bacteriophages. • Diversity, classification, one step multiplication curve, lytic and lysogenic phages. • (Lambda and P1 phage), concept of early and late proteins, regulation of transcription. • In lambda phage and applications of bacteriophages.	6
6.	• Viral multiplication and replication strategies. • Interaction of viruses with cellular receptors and entry of viruses. • Replication strategies of viruses as per Baltimore classification. • Assembly, maturation and release of virions. • Concept of defective particles.	6
7.	• Transmission of viruses. • Persistent and non-persistent mode.	3
8.	• Oncogenic viruses. • Types of oncogenic DNA and RNA viruses. Concepts of oncogenes, proto24. • oncogenes and tumor suppressor genes.	3
9.	• Prevention and control of viral diseases. • Antiviral compounds, interferon's and viral vaccines.	3
10.	• Applications of Virology. • Use of viral vectors in cloning and expression, Gene therapy and Phage display.	3
Total		**45**
Topics to be covered (laboratories)		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm 1	Around 5th - 6th week	15%
2.	Midterm 2	Around 8th - 9th week	15%
3.	Quizzes, Attendance, Participation, Home works	All the semester	10 %
4.	Lab reports.	All the semester	5%
5.	Lab Exam	Around 10th week	15 %

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
6.	Final Exam.	Around 11th week	40 %

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

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Flint et al. Principles of virology .3rd eds.2008, ISBN: 13: 9781555814434
Supportive References	• Alan J. Cann Principles of Molecular Virology, 6th Edition (2015). ISBN-13: 978-0128019467. • John Carter, Virology: Principles and applications, (2014) ,2nd ed. ISBN: 13: 97811999142.
Electronic Materials	Google Classroom Webpage: http://www.imamm.org
Other Learning Materials	• Electronic biological programs. • CDs to biological viruses. • Electronic programs for isolating viruses and their development ways. • Electronic programs include the most prominent diseases caused by viruses. • Research Tools.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students. And the laboratory room is equipped with many laboratory instruments with a maximum of 20 students.
Technology equipment (projector, smart board, software)	• A computer for display and uses of data with a slide show presentation. • High-device "projectors" Lighting. • It is assumed that each student has its own computer.
Other equipment (depending on the nature of the specialty)	Specific laboratory equipment for this course including posters, models of different experimental animals , dissection instruments, light microscopes , dissection microscopes ,microtome instrument, slide preparations, mixer, fluorescent microscopes , ELISA unit for detecting Ag-Ab reactions , molecular instruments like gel electrophoresis ,PCR centrifuge , thermal cycler , an illuminator ,centrifuges , incubators , ovens and other glass wares.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching		
Effectiveness of Students assessment		

Assessment Areas/Issues	Assessor	Assessment Methods
Quality of learning resources		
The extent to which CLOs have been achieved		
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	HEAD OF BIOLOGY DEPARTMENT
REFERENCE NO.	
DATE	