



SYLLABUS

Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level	Teaching Language
BIO	345	Virology	4	3	2	0	6	BIO 242	6	English

A. Instructor information

Name and E-mail	Office phone	Office location	Office hour
Dr Marwa Yousry Abdel Monem Mymohamed@imamu.edu.sa om	----	Building: 323 Level:4 Room: A444	Sun: 9 A.M.-10 A.M Sun:1 p.M- 2 P.M. Wed:1 p.M- 2 P.M.

B. Course 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.

C. Course Outcomes

By the end of this course the student will be able:

1. To have the scientific background about virus structure and replication, their pathogenesis, host immune responses against them, and their control.
2. To know how to deal with samples containing viral particles, the method used for virus isolation.
3. To deal with the common viral diseases that affect animal and poultry flocks, regarding laboratory diagnosis, prevention and control.
4. To recognize the multiplicity of virus transmission factors.
5. To compare human diseases, animals and plants by viruses.
6. To clarify the role of viruses in transforming normal cells into cancerous.
7. To remember the role of viruses in the vaccination and immunization.



D. References:

Required Textbook

- 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.

Other references:

- Flint et al. *Principles of virology* .3rd eds.2008, ISBN: 13: 9781555814434.Griffiths, A.J.F et al (2008)

Course Website: Google Classroom Webpage: <http://www.imamm.org/>

E. Topics Outline

E.1. Lectures topics

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.
2. **Structure of viruses;** Capsid symmetry, enveloped and non-enveloped viruses; Isolation, purification and cultivation of viruses.
3. **Viral Taxonomy;** Classification and nomenclature of different groups of viruses infecting microbes, plants and animals.
4. **Salient features of viral genomes;** Unusual bases (TMV, T4 phage), overlapping genes (Φ X174, Hepatitis B virus); Alternate splicing (Picornavirus), terminal redundancy (T4 phage), and terminal cohesive; Ends (lambda phage), ambientes 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. **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.
7. **Transmission of viruses;** Persistent and non-persistent mode.
8. **Oncogenic viruses;** Types of oncogenic DNA and RNA viruses. Concepts of oncogenes, proto24; oncogenes and tumor suppressor genes.
9. **Prevention and control of viral diseases;** Antiviral compounds, interferon's and viral vaccines.
10. **Applications of Virology;** Use of viral vectors in cloning and expression, Gene therapy and Phage display.



E.2. Laboratories topics

1. **Introduction** include the identification of the syllabus and security and safety precautions.
2. To study **structure of important animal viruses** (rhabdo, influenza, paramyxo, Hepatitis B & retroviruses) using electron micrographs.
3. To study **structure of important bacterial viruses** (λ , T4 & ϕ X174) using electron micrographs.
4. To study **structure of important plant viruses** (calico, gemini, tobacco ring spot, cucumber mosaic & alpha-alpha mosaic viruses) using electron micrographs.
5. **Isolation and enumeration of bacteriophages** from water/sewage sample using double agar layer technique.
6. **Isolation and propagation of animal viruses** by cell culture and chick embryo techniques.
7. **Study of cytopathic effects** using photographs.
8. To perform **local lesion technique** for assaying plant viruses.
9. A **comprehensive review** of the curriculum

F. Office Hours

Office hours give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

G. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6th or 7th week.
- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homeworks:** During the semester.
- **Final lab. Exam :** 14th or 15th week.
- **Final Exam:** 16th week.

Your course grade will be based on your semester work as follows:

Midterm 1: 15 %	Midterm 2: 15 %	Final lab. Exam: 20%	Final Exam: 40 %
Quizzes, Homework , Attendance & Participation:10 %			

The grading distribution:

A ⁺	A	B ⁺	B	C ⁺	C	D ⁺	D	F
[95, 100]	[90, 95]	[85, 90]	[80, 85]	[75, 80]	[70, 75]	[65, 70]	[60, 65]	[0, 60]



H. Student Workload

#	Teaching/Learning activities	Contact hours	Frequency	Total contact hours	Self-study hours	Total Self-study hours	Student learning time
5	Lecture	3	15	45	2	30	75
2	Tutorial	0	0	0	0	0	0
0	Lab/ practical	2	15	30	1	15	45
5	Home work	0	4	0	2	8	8
4	Quiz	0.5	2	1	1	2	3
6	Midterm	1.5	2	3	5	10	13
7	FinalExam	2	1	2	12	12	14
Total				81		77	158

The independent self-study is approximately 5 hours per week

I. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. (“Immediate family” is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

[Executive Rules for Study Regulations and Exams](#)

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