General Virology

Benha University **Faculty of Veterinary Medicine**

Program on which the course is given: **Bachelor of Veterinary Medical sciences**
Department offering the course: **Department of Virology**
Academic year / level: **Third year, 1st semester**
(Approved in this template by the department council on 15/6/2009 AND UPDATED ON 10-1-2011)

A- Basic Information

Title: General Virology **Code: Vet 00633a**
Lecture: 1 hours / week
Practical: 3 hours/week **Total:** 4 hours/week

B- Professional Information

1- Overall aims of course

- Help the students to under stand the fundamental characters of viruses.
- Provide the students with an over view on physical and chemical properties of viruses.
- Study the biological properties of the viruses in relation to virus Haemagglutination, virus replication in the cell, pathogenesis of viral infection and interference phenomena.
- Provide the students with the required knowledge about host immune response to viral infection.
- Provide the students with strategies to protect against and combat viral infection through vaccination.
- Studying the effect of some physical and chemical agents on viruses.
- Experimental description and application of techniques used for preparation and isolation of suspected viral samples.

2- Intended learning outcomes of the course (ILO_s):

a- Knowledge and understanding

After successful completion of the course the students should be able to:

a.1- Mention the basics of the fundamental characters of viruses.
a.2- Describe the size, shape and Molecular weight of viruses.
a.3- Describe the chemical composition and chemical structure of viruses.
a.4- Define, classify and explain factors affecting Haemagglutination.
a.5- Explain the steps involved in virus replication at cellular level.
a.6- Realize the stages evolved and mechanism of pathogenesis of viral infection.
a.7- Describe the outcomes of infection of a single cell with two viruses.

a.8- Define and describe the types, biological character, mechanism of production and mode of action of interferon in addition to factors affecting their production.
a.9- Define and illustrate the cellular and humoral immune response to viral infection.
a.10- Recognize the basics of viral vaccines.
a.11- Explain the effect of physical and chemical agents on viruses and their mechanism.
a.12- Mention General scheme for viral isolation & identification

b- Intellectual skills

After successful completion of the course the students should be able to:
b.1- Distinguish viruses from other micro-organisms.
b.2- Evaluate the viral size, shape and molecular weight and use it in viral classification.
b.3- Analyze the chemical structure (nucleic acid, capsid, envelop) of viruses based on their chemical composition.
b.4- Compare between RNA and DNA viruses.
b.5- Interpret the haemagglutination properties of the viruses and their use in viral purification and concentration.
b.6- Correlate the steps of viral multiplication at cellular level with the cytopathic effect for different viruses.
b.7- Compare between different stages and mechanisms of viral pathogenesis.
b.8- Differentiate between interferon and antibody with an explanation to mode of action of interferon.
b.9- Link between the cellular and humoral immune response to viral infection.
b.10- Suggest methods for preparation of different viral vaccines.
b.11- Interpret the effect of some physical and chemical agents on viruses.
b.12- Choose the suitable method for preparation and preservation of suspected viral sample.
b.13- Choose the susceptible host system and route of inoculation during isolation of suspected viral sample.

c- Professional and practical skills

c.1- Skills during sampling:

After successful completion of the course the students should be able to:
c.1.1- Collect samples at right time, right site, right condition and complete right data.
c.1.2- Preserve suspected viral sample using suitable methods of preservation.
c.1.3- Prepare different forms of samples under complete aseptic conditions.

c.2- Skills during Lab. animal inoculation:

After successful completion of the course the students should be able to:

c.2.1- Investigate Lab. animals before and after inoculation with suspected viral samples.

c.2.2- Investigate Lab. animals with different routes of inoculation.

c.2.3- Collect different samples from Lab. animals for virological purposes.

c.3- Skills during fertile egg inoculation:

After successful completion of the course the students should be able to:

c.3.1- Examine and select suitable SPF fertile egg used for virus isolation.

c.3.2- Manipulate and inoculate fertile egg with different routes under complete aseptic conditions.

c.3.3- Harvest and examine fertile egg to detect signs of viral growth.

c.4- Skills during tissue culture inoculation:

After successful completion of the course the students should be able to:

c.4.1- Manipulate different equipments used in tissue culture room.

c.4.2- Prepare primary tissue culture under aseptic condition.

c.4.3- Identify different types of primary tissue culture & cell line.

c.4.4- Examine and detect the changes in tissue culture media.

c.4.5- Provide cells with its basic requirements for growth.

c.4.6- Prepare maintaince and growth media and dispersing solutions.

c.4.7- Subculture and preserve tissue culture for short and long period.

c.4.8- Inoculate tissue culture during confluency and in suspension.

c.4.9- Recognize viral growth on tissue culture under inverted microscope.

d- General and transferable skills

After successful completion of the course the students should have fair Experience in the following skills

d.1- Biosafety.

d.2- Working under aseptic condition.

d.3-Cooperate and work in a team

d.4-Use the computer for searching

d.5- Mural and culture of virologist.

3- Contents :

Topic	No. of hours	Lecture	practical
(1)Introduction (2)Fundamental characters of viruses	1	1	
(3) General Properties of viruses A. Physical properties of viruses. B. Chemical properties of viruses.	2 2	2 2	
(4) Viral Haemagglutination	1	1	
(5) Virus cell relationships (virus multiplication)	2	2	
(6) Pathogenesis of viral infection	2	2	
(7) Interference phenomenona	1	1	
(8) Viral immunity	1½	3	
(9) Viral vaccines	1½		
(10) Effect of physical & chemical agents on viruses	1	1	
(1) General scheme for viral isolation & identification	3		3
(2) lab safety	3		3
(3) sampling • Collection • Preservation • preparation	6		6
(4) lab animal • advantage • disadvantage • route of inoculation • hyper immune serum • monoclonal antibodies	6		6
(5) fertile egg • advantage • disadvantage • specifications • structure • route of inoculation • harvestation • signs and factors affecting	12		12

(6) tissue culture • advantage • disadvantage • equipments • tissue culture media and solution • types of cells • basic requirements for growth of cells • preparation of primary culture • subculture of cells • preservation of cell culture • inoculation of cell culture • CPE • Harvestation of inoculated cell culture	15		15
total	60	15	45

4- content-ILOs matrix

topic	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	c1	c2	c3	c4	d1	d2	d3	d4	d5
Fundamental characters of viruses	√											√																				√	√
Physical properties of viruses		√											√																			√	√
Chemical properties of viruses.			√											√	√																	√	√
Viral Haemagglutination				√												√																√	√
Virus cell relationships (virus multiplication)					√												√															√	√
Pathogenesis of viral infection						√												√														√	√
Interference phenomenona							√	√											√													√	√
Viral immunity									√											√												√	√
Viral vaccines										√											√											√	√

topic	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10	a11	a12	b1	b2	b3	b4	b5	b6	b7	b8	b9	b10	b11	b12	b13	c1	c2	c3	c4	d1	d2	d3	d4	d5
Effect of physical & chemical agents on viruses											√												√									√	√	√
General scheme for viral isolation & identification												√																				√	√	√
lab safety																														√	√	√	√	√
sampling																								√		√						√	√	√
lab animal																									√		√					√	√	√
fertile egg																									√			√				√	√	√
tissue culture																									√				√			√	√	√

5- Assessment-ILOS matrix

assessment	a 1	a 2	a 3	a 4	a 5	a 6	a 7	a 8	a 9	a 10	a 11	b 1	b 2	b 3	b 4	b 5	b 6	b 7	b 8	b 9	b 10	b 11	b 12	b 13	c 1	c 2	c 3	c 4	d 1	d 2	d 3	d 4	d 5
Assessment 1 Semester work	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Assessment 2 Practical exam											√												√	√	√	√	√	√	√	√			
Assessment 3 Oral exam	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√									
Assessment 4 Written exam	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√									

6- Teaching and learning methods

4.1- Lectures using the White board and the Positive slide projector.
4.2- Demonstration of instruments used during preparation & isolation of suspected viral samples.
4.3- Using the laboratory to perform preparation, preservation, inoculation and other routine work of isolation of suspected viral sample.

7- Student assessment methods

5.1- Semester work including oral, quiz written exams and searches to assess Knowledge information & intellectual and transferable skills.
5.2- Practical exam (final term) to assess professional & practical skills and part from knowledge and transferrable skills.
5.3- Oral exam (final term) to assess knowledge & information & intellectual skills.
5.4- Written exam (final term) to assess knowledge & information and intellectual skills.

Assessment schedule

Assessment 1 Semester work		week 4,8,12
Assessment 2 Practical exam	week	13
Assessment 3 Oral exam	week	15
Assessment 4 Written exam	week	15

Weighting of assessment

Mid-term examination	
Semester work	5%
Practical work	30%
Oral examination	15%
Final exam (written)	50%
Total	100%

8- List of references

8.1- Course notes

- Veterinary virology (Part I: General virology)
  Gabr.F. El-Bagoury. Benha University
- A laboratory manual for diagnostic virology
  Gabr.F. El-Bagoury. Benha University

8.2- Essential books (text books)

- Methods and techniques in virology (1993) by Pierre payment and Michel Trudel. Marcel Dekker, INC/New York.
- A colour Atlas of virology (1985) by J. Versteeg. Wolfe Medical Puplications Ltd / Netherland.
- Virology (1994) by Jay. A. Levy, Heinz Frankel. Conrat and Robert. A. Owens. Paramount Communication Company / U.S.A.

- Basic virology (2004); By Edward K. Wagner and Martinez. J. Hewlett by Blackwell Science Inc/U.S.A.
- Veterinary Diagnostic virology (1992) by Anthony. E. Castro and Werner P. Heuschele. Mosby – year book, Inc / U.S.A.
- Principles of bacteriology, virology and immunity (Vol. 4) (1984) by w.w.c. Topley and Wilson;s. Edward Arnold Ltd / London.
- Vaccines for veterinary Applications (1993) by A.R. Peters. Butter worth-Heinemann Ltd / England.
- In vitro cultivation of Animals cell (1993) published on behalf of open universiteit and university of Green wich. Butter worth-Heinemann / England.
- Immunology (1992) by Janis kuby. W.H. Freeman and Company / U.S.A.

8.3- Recommended books

- Course notes.
- A colour Atlas of virology (1985) by J. Versteeg. Wolfe Medical Publications Ltd. / Netherland.
- Methods and Techniques in Virology (1993) by Pierre payment and Michael Trudel. Marcel Dekker, INC / New York.
- Basic virology (2004) by Edward K. Wagner and Martinez. J. Helwlett- by black well science Inc / U.S.A.
- Immunology (1992) by Janis Kuby. W.H. Freeman and Company / U.S.A.

8.4- Periodicals, Web sites, . . . etc

- www.net vet.mustle.edu/
- www.net vet.mustle.edu/vet med.htm.
- www. alt vet med. com/.
- www. wsvma.org/.
- foot and mouth disease bulletin

9- Facilities required for teaching and learning

1- Laboratory.
2- Routine chemical kits for tissue culture.
3- Equipments such as T.C. incubators, T.C. filters, water baths a balance, refrigerators, deep freeze & centrifuges.
4- Power point data show & computer Lab.

Course coordinator:
Prof.Dr. Gabr F. El-Bagoury

Head of department
Prof.Dr. Gabr F. El-Bagoury