



Genetic Engineering

Benha University

Faculty of Veterinary Medicine

Program on which the course is given: **Bachelor of Veterinary Medical Science**

Department offering the course: **Animal Wealth Development Department**

Academic year: **2nd year**

Date of specification approval: Ministerial Decree No 921, on 15/9/1987.

(Then approved in this recent template by department council on 12/3/2006)

A- Basic Information

Title : Genetic Engineering

Code: Vet 00627 b

Lecture: 30 hrs

Practical: 30 hrs

Total: 60 hrs

B- Professional Information

1- Overall aims of course

Provide the student the knowledge about recombinant DNA and genetic engineering, the knowledge about genetic manipulation and methods for studying the genome.

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

a- Knowledge and understanding

By completion of the course the student should be able to

- a.1- Understand the characteristics of genetic material and different methods of its manifestation and applications (PCR, REFLP etc).
- a.2- Know the relationship between the genetic material, diseases, immunity and the genetic control of them.

b- Intellectual skills

By completion of the course the student should be able to

- b.1- Solve different genetic problems.
- b.2- Use and understand different method of biotechnology in several fields like, medicine, diagnosis of different diseases, pharmaceuticals production and animal wealth development.
- b.3- Use genetics as a tool for control of inherited diseases.

c- Professional and practical skills

By completion of the course the student should be able to

c.1- Use of genetic material (chromosome and DNA) as a tool to measure genotoxicity of different environmental pollutants.

c.2- Detect similarities and differences between different species based on DNA polymorphism.

d- General and transferable skills

d.1- Solve problems associated with Sexing of animal spp.

d.2- co operate with biotechnology lab for Isolation of DNA from different tissues.

d.3 Use computers, software and CDs for educational purposes and Internet searching .

Topic	No. of hours	Lecture	Practical
1- Kariological (chromosomal) studies	6	-	6
2 -Chromosomal banding technique	6	-	6
3 -Chromosomal aberrations: • Numerical changes. • Structural changes.	6	-	6
4 -Sex determination	4	-	4
5 -Fertility as affected by chromosome	-	-	-
6 -The genetic material	-	-	-
7 -DNA replication	-	-	-
8 -The genetic code	-	-	-
9 -Genetic expression	4	4	-
10-Regulation of protein synthesis	2	2	-
11 -Mutation and DNA repair mechanism	4	4	-
12 -The genetic manipulation	8	4	4
13 -Recombinant DNA and genetic engineering	8	4	4
14-Methods for studying the genome	4	4	-
15-Inherited diseases of biochemical origin	2	2	-
16-immunogenetics	2	2	-
17-Genetic resistance and pathogens	2	2	-
18-Control of inherited diseases	2	2	-
Total	60	30	30

4- content-ILOs matrix

Content	ILOs			
	Knowledge	Intellectual	Professional	General



	and understanding		and practical	and transferable
Cytological basis of inheritance	A1, a2	b1, b2,b3	c1, c2 , c3	d1, d2,d3
Mathematical principles required for genetic problems	a1			d1
Transmission and quantitative genetics	a1, a2	b1, b2,b3	c1, c2	d1, d2, d3
Phenotypic expression	A2		C2	D3
Linkage, crossing over and chromosome mapping	a2	b3	c2	d1
- Some special cases of interphase chromosome	a1, a2	b1, b2	c1, c2	d1, d2
Kariological (chromosomal) studies	a2	b2,b3	c1, c2	d1, d2
- Chromosomal banding technique	a2	b2,b3	c1, c2	d2
Chromosomal aberrations: • Numerical changes. Structural changes	A2	b2,b3	c1, c2	d2
Sex determination	a2	b2,b3	c1, c2 , c3	d2
Fertility as affected by chromosome	a2	b2,b3	c1, c2 , c3	d2
The genetic material				
DNA replication				
The genetic code				

5- Assessment-ILOS matrix

Assessment	ILOS			
	Knowledge and understanding	Intellectual	Professional and practical	General and transferable
Mid – Term exam	A1, a2	b1, b2,b3		
Practical exam	a1,a2	b1, b2,b3	c1, c2 , c3	
Oral exam	a1, a2	b1, b2,b3		
Final term exam	A1,a2	b1, b2,b3	c1, c2 , c3	
Assignments and research		b1,b2,b3		d1, d2, d3



4- Teaching and learning methods

4.1- Lectures

4.2- Clinical and small group sessions.

- a) Microscopical demonstration of slides.
- b) Practical training for methods of karyotyping.
- c) General experimental tests teaching.
- d) Gene mapping by linkage studies.
- e) Restriction mapping.

4.3- CD's-slides and video tapes.

Demonstration of instruments used in genetic engineering like PCR,
DNA sequencing and DNA electrophoretic system.

4.4- Experimental animal and tissue culture.

5- Student assessment methods

5.1- Written exam to assess knowledge and understanding.

5.2- Oral exam to assess understanding, intellectual and transferable skills.

5.3- Practical sheet examination for assessment of the theoretical part of the
practical course.

5.4- Microscopical slides examination for assessment of practical and
intellectual skills.

Assessment schedule

Assessment 1	Written examination	15	Week
Assessment 2	Oral examination	15	Week
Assessment 3	Practical examination	13	Week.
Assessment 4	Mid term examination	6,10	Week.

Weighting of assessment

Mid-term examination	5 %
Final examination	50%
Oral examination	20%
Practical examination	20%
Semester work	5%
Other types of assessments	0%
Total	100%

6- List of references

6.1- Department books:

Course note is available for the students to purchase from book shops.



6.2- Essential books (Text books):

- Concept of genetics “William, Michael, Charlot 2006”.
- Genetics “P.S. Verma, V.K. Aggarwal 2006”.
- Cytogenetics “S. Sundara Rajan 2005”.
- Genetic of population “ Philip W.H. 2006”.

6.3- Periodicals, Web sites, . . . etc.

- www. Pubmed.com
- Journal of Animal Science.
- Genetics Journal.
- Genomic Journal.

7- Facilities required for teaching and learning

- 7.1. Lecture Hall: writing board, over head and slide projector are available. Data show is available with prior arrangements.
- 7.2. Genetics Lab.
- 7.3. Experimental and Lab. Animals.

Course coordinator: Prof. Dr. Shabaan Abd-Elatif hameda

Head of department: Prof. Dr. Hatem H. El-Bakry

Date :