Specification for Genetics
2025/2026

1-Basic information

1.	**Course title**	Genetic							
2.	**Course code**	AWD.211							
3.	**Department offering the course**	Animal Wealth Development							
3.	**Level**	2nd year							
4.	**Semester**	fall semester							
5.	**Number of units/credit hours**	Theoretical	1	Practical	1(2)	Other	0	Total	2(3)
6.	**Course Type**	√ **Obligatory** **Elective**							
7.	**Academic program**	Bachelor of Veterinary Medicine (BVM)							
8.	**University**	Benha University							
9.	**Faculty**	Veterinary medicine							
10.	**Name of course coordinator**	Ass.Prof\ Olla Adel Khalifa							
11.	**Course Specification Approval Date**	Faculty council 27-8-2025							
12	**Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)**	Department council/							

2-Course overview

- **Course contents written in the program by law:**
  Molecular genetics and Biotechnology: The genetic materials; DNA replication; Genetic expression; Gene regulation and protein synthesis; mutations and mutagens.

3- Intended learning outcomes of the course (ILOs):

(NARS)			**Course ILOS**	
	Code	**Content**	**Code**	**Content**
			a1	Describe basis of inheritance.
			a2	Mention and Explain different mechanisms of

				chromosomal aberration and its reflection on phenotype of individual diseases.
Knowledge and understanding	2.1	Basic sciences of biology, chemistry, biophysics, genetics, biostatics, computer science and veterinary terminology.	a3	Identify different characteristics of genetic material and different methods of its manipulation and applications.
			a4	Discuss and explain genetic variations.
			a5	Relate between the genetic material, diseases, immunity and the control of these diseases.
			a6	Relate the ability to coal late different pieces of accurate information
Intellectual skills	4.4	Proficiently secure diagnostic reasoning, develop problem lists and differential diagnosis in order to deductively and critically reach the most appropriate solution (s) and management of the addressed clinical problems..	b1	Differentiate among different stages of the cell cycle microscopically including mitosis and meiosis.
			b2	Interpret the karyotype reports.
			b3	Evaluate the chromosomal aberrations (numerical or structural)
			b4	Discover relationship between the exposure to environmental pollutants and incidence of chromosomal aberrations and increased incidence of cancer.
			b5	Distinguish area where further research is necessary and is aware beyond current ethical codes list
Professional and practical skills	3.8	Skillfully and appropriately gain and use new information remain current with the emerging	c1	Investigate chromosome number and karyotyping of different species.
			c2	Diagnose phenotypic malformation and sterility problems associated with chromosomal aberrations.

		biomedical knowledge and therapeutic options.	c3	Examine normal and abnormal spermatogenesis through preparation of chromosome from the tests.
			c4	Conduct appropriate range of Experimental techniques
	D			
General and transferable skills	5.1	Work under pressure and / or contradictory conditions.	d1	Work under pressure during lab session of genetics
	5.5	Search for new information and technology as well as adopt life–long self-learning ethics.	d2	Search for new information and technology
	5.6	Utilize computer and internet skills.	d3	Manipulate and organize tasks and Utilize computer and internet skills

4- Teaching and learning methods					
Lectures	√	**Discussion & seminar**	√	**Practical**	√
Presentation & movies	√	**Problem solving**	√	**Brain storming**	√
Others					

Course Schedule:

Number of the Week	**Topics**	**Expected number of the Learning Hours**					
		Theoretical teaching (lectures/ discussion groups/ .....)	**Practical content**	**Training (Practical/Clinical/ .....)**	**Self-learning (Tasks/ Assignments/ Projects/ ...)**	**Others**	**Total Weekly Hours**
W1	Def. Approaches of genetic, structure	**1**	Introduction, Animal cell, Prokaryotes & eukaryotes	**1(2)**		**0**	**2(3)**
W2	Digestion of chromatin, structure of chromosome	**1**	Cell cycle & mitosis	**1(2)**		**0**	**2(3)**

W3	Karyotyping and banding technique	**1**	Meiosis	**1(2)**	**Formative quiz**	**0**	**2(3)**
W4	Numerical chromosomal aberrations	**1**	Gametogenesis & slides	**1(2)**		**0**	**2(3)**
W5	Numerical chromosomal aberrations	**1**	First mendelian law & test cross	**1(2)**		**0**	**2(3)**
W6	Numerical chromosomal aberrations	**1**	Modes of inheritance	**1(2)**	**Formative quiz**	**0**	**2(3)**
W7	Semester work including 1hr exam		----------				
W8	Structure aberration	**1**	Modes of inheritance	**1(2)**		**0**	**2(3)**
W9	Structure aberration	**1**	Genetic problems	**1(2)**		**0**	**2(3)**
W10	Structure aberration	**1**	Second mendelian law & test cross	**1(2)**	**Formative quiz**	**0**	**2(3)**
W11	Sex differentiation	**1**	Karyotyping	**1(2)**		**0**	**2(3)**
W12	Sex related diseases	**1**	Karyotyping	**1(2)**		**0**	**2(3)**
W13	Nucleic acid structure	**1**	Epistasis	**1(2)**	**Formative quiz**	**0**	**2(3)**
W14	Nucleic acid structure	**1**	Epistasis Genetic problems	**1(2)**		**0**	**2(3)**
W15	Practical exam	----------					

5- Assessment timing and grading:

a- Assessment methods (summative and formative)

1. **Formative assessment**: including (weekly quizzes, homework assignments and surveys).
2. **Summative assessment** including (quizzes, class activities, 1hr exam, practical exam, oral exams and final written exams).

b- Assessment schedule and weight

Assessment method	Timing	Grade	Percent
Semester work (1hr exam)	7th week	10	10%
Formative assessment	Throughout the semester	-------	---------
Practical exam	15th week	30	30%
oral exam	End of semester	10	10%
Written exam	End of semester	50	50%
Total		100	100%

6- Learning resources and supportive facilities:

Learning resources	**Main reference**	**Student handbook**: department notes
	Essential books (text books)	• P.S. Verma, V.K. Aggarwal (2006).Genetics • Philip W.H. (2006).Genetic of population • S. Sundara Rajan (2005)Cytogenetics • Course note. • P.S. Verma, V.K. Aggarwal (2006).Genetics. • William, Michael, Charlot (2006).Concept of genetics
	Periodicals, Web sites, . . . etc	\ • Journal of Animal Science. • Genomic Journal. • Genetics Journal • www.Pubmed.com • www.ekb.eg
	Learning platform	Thinqi
supportive facilities	**Devices & instruments**	**Microscope** **Mixer, Water Bath** **Sensitive Balance** **Horizontal Electrophoresis** **Vertical Electrophoresis** **Thermal cycler, Vortex** **Ordinary Centrifuge**
		• Lecture Hall: Writing board and Data show. • Genetics Lab. • Central laboratory. • Central research of experimental animals

Matrices:

A- Content and ILOs matrix:

Topic	A) Knowledge and understanding	B) Intellectual skills	C) Professional and practical skills	D) General and transferable skills
Cytological basis of inheritance	a1,a2	b1,b2,b3,	c1,c2,c3	d1,d2,d3
Mathematical principles required for genetic problems	a1,a2	-	-	d1
Transmission and quantitative genetics	a1,a2,	b1,b2,b3	c1,c2,	d1,d2,d3
Phenotypic expression	a1,a2,		c2,	d1,d2,d3
Linkage, crossing over and chromosome mapping	a1,a2,	b3	c2,	d1
Some special cases of interphase chromosome	a1,a2,	b1,b2,	c1,c2,	d1,d2,d3
Kariological (chromosomal) studies	a1,a2,	b2,b3	c1,c2,	d1,d2,d3
Chromosomal banding technique	a1,a2,	b2,b3	c1,c2,	d1,d2,d3
Chromosomal aberrations: • Numerical changes. • Structural changes	a1,a2,a3,a4 a5,a6,	b2,b3	c1,c2,	d1,d2,d3
Sex determination	a1,a2,a3,a4 a5,a6,	b4 b5	c1,c2,c3,c4	d1,d2,d3
Fertility as affected by chromosome	a1,a2,a3,	b4 b5	c1,c2,c3,c4	d1,d2,d3
The genetic material	a3,a4 a5,a6,	,b4,b5	c1,c2,c3,c4	d1,d2,d3
DNA replication	,a3,a4 a5,a6,	,b4,b5	c1,c2,c3,c4	d1,d2,d3
The genetic code	,a3,a4 a5,a6,	,b4,b5	c1,c2,c3,c4	d1,d2,d3

B- Teaching, learning and assessment methods:

ILOs		Teaching and Learning methods					
		L	P&M	D&S	P	Ps	Bs
Knowledge and understanding	a1	√		√	√	√	
	a2	√		√	√	√	
	a3	√		√		√	
	a4	√		√		√	
	a5	√		√		√	

	a6	√		√		√	
Intellectual skills	b1			√			
	b2			√			
	b3			√			
	b4			√			
	b5			√			
al and practical	c1				√		
	c2				√		
	c3				√		
	c4				√		
Genera skills	d1			√	√		√
	d2	√	√				√
	d3	√	√	√	√		√

L **:Lecture,** P&M**: Presentations & Movies,** D&S: **Discussions & Seminars** PT**: Practical training,** Ps: **Problem solving,** Bs: **Brain storming**

C- Assessment methods and ILOS:

ILOs		assessment method				
		formative	Semester 1hr exam	oral	practical	written
Knowledge and understanding	a1		√	√		√
	a2		√	√		√
	a3		√	√		√
	a4		√	√		√
	a5		√	√		√
	a6		√	√		√
Intellectual skills	b1	√	√	√		√
	b2	√	√	√		√
	b3	√	√	√		√
	b4	√	√	√		√
	b5	√	√	√		√
al and practical	c1				√	
	c2				√	
	c3				√	
	c4				√	
Genera skills	d1			√		
	d2			√		
	d3			√		

Course coordinator: Ass.Prof\ Olla Adel Khalifa
Head of department Prof. Dr. Sherif Ramadan
-Program coordinator: Prof. Dr. Mahmoud Abouelroos