

Course Syllabus

1	Course title	General Genetics	
2	Course number	0304281	
3	Credit hours	3	
	Contact hours (theory, practical)	(2,3)	
4	Prerequisites/corequisites	Bio 0304101	
5	Program title	B.Sc. in Biological Sciences	
6	Program code	0304	
7	Awarding institution	The University of Jordan	
8	School	School of Science	
9	Department	Biological Sciences Department	
10	Course level	Second year	
11	Year of study and semester (s)	2022/2023, First Semester	
12	Other department (s) involved in teaching the course	Non	
13	Main teaching language	English	
14	Delivery method	<input type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date	Oct.9.2022	

17 Course Coordinator:

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**18 Other instructors:**

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

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Email:

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19 Course Description:

As stated in the approved study plan.

Mendelian genetics; statistical and pedigree analysis; sex determination; gene linkage and recombination; extranuclear inheritance; modification in chromosome number and structure; fine structure of the gene; the molecular structure of the gene and its replication; transcription; gene action and regulation of gene expression, molecular basis of mutagenesis; population genetics, genetic engineering and laboratory work in basic genetics.



20 Course aims and outcomes:

A- Aims:

Gaining the knowledge and the skills of applying genetics concepts to explain how phenotypes are transmitted from one generation to another in different organisms including plant, animal and human.

B- Students Learning Outcomes (SLOs):

Upon successful completion of this course, students will be able to:

SLOs SLOs of the course	SLO (1)	SLO (2)	SLO (3)	SLO (4)
1. Understand the concepts of DNA and gene as the unit of inheritance.				
2. Understand the Concept of Mitosis and Meiosis genetically.				
3. Understand the concepts and the applications of Mendelian and Non- Mendelian genetics.				
4. Understand the concept of sex determination genetically.				
5. Understand the basic concepts of cytogenetics and chromosomal aberrations including karyotyping.				
6. Understand the basic concepts of				

extranuclear Inheritance				
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21. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Chapter 1: Introduction to Genetics 1.1.Genetics has a Rich and interesting History	1	Face to Face	-	-	Exam	37-43

		1.2.Genetics Progressed from Mendel to DNA in Less Than a Century 1.3.							
	1.2	1.3. Discovery of the Double Helix Launched the Era of Molecular Genetics	1	Face to Face	-	-	Exam		
	1.3	Lab: Introduction		Face to Face	-	-	Exam		
2	2.1	Chapter 10: DNA Structure and Analysis 10.1 The Genetic Material Must Exhibit Four Characteristics 10.6 Knowledge of Nucleic Acid Chemistry is essential to the Understanding of DNA Structure 10.7 The Structure of DNA holds the Key to Understanding its Function	1	Face to Face	-	-	Exam		251, 260-266
	2.2	Chapter 3: Mendelian Genetics 3.1. Mendel Used a Model Experimental Approach to Study Patterns of Inheritance	3	Face to Face	-	-	Exam & Report		72-97
	2.3	Lab: Safety Instructions		Face to Face	-	-	Exam & Report		
3	3.1	3.2. The Monohybrid Cross Reveals How One Trait is Transmitted from Generation to Generation	3	Face to Face	-	-	Exam & Report		
	3.2	3.3. Mendel's Dihybrid Cross Generated a Unique F2 Ratio	3	Face to Face	-	-	Exam & Report		
	3.3	Lab: Physical & Chemical Properties of Genetic Material		Face to Face	-	-	Exam & Report		

4	4.1	3.4. The Trihybrid Cross Demonstrates that Mendel's Principles Apply to Inheritance of Multiple Traits	3	Face to Face	-	-	Exam & Report		
	4.2	3.5. Mendel's Work was Rediscovered in the Early Twentieth Century 3.6. Independent Assortment Leads to Extensive Genetic Variation 3.8. Chi-Square Analysis Evaluates the Influence of Chance on Genetic Data 3.9. Pedigrees Reveal Patterns of Inheritance of Human Genetics 3.10. Mutant Phenotypes Traits Have Been Examined at Molecular Level	3	Face to Face	-	-	Exam & Report		
	4.3	Lab: Cell Cycle & Mitosis	2	Face to Face	-	-	Exam & Report		
5	5.1	Chapter 4: Extensions of Mendelian Genetics 4.1. Alleles Alter Phenotypes in Different Ways	3	Face to Face	-	-	Exam & Report	98-129	
	5.2	4.2. Geneticists Use a Variety of Symbols for Alleles	3	Face to Face	-	-	Exam & Report		
	5.3	Lab: Meiosis	2	Face to Face	-	-	Exam & Report		
6	6.1	4.3. Neither Allele is Dominant in Complete or Partial, Dominance	3	Face to Face	-	-	Exam & Report		
	6.2	4.4. In Codominance, The Influence of Both Alleles in a Heterozygote is Clearly Evident	3	Face to Face	-	-	Exam & Report		

	6.3	Lab: Working with <i>Drosophila</i> as a Model for Genetic Studies	3	Face to Face	-	-	Exam & Report		
7	7.1	4.5. Multiple Alleles of a Gene May Exit in a Population	3	Face to Face	-	-	Exam & Report		
	7.2	4.6. Lethal Alleles Represent Essential Genes	3	Face to Face	-	-	Exam & Report		
	7.3	Lab: Mendelian Genetics and Sex Linkage Inheritance	3	Face to Face	-	-	Exam & Report		
8	8.1	4.7. Combinations of Two Gene Pairs with Two Modes of Inheritance Modify the 9:3:3:1 Ratio	3	Face to Face	-	-	Exam & Report		
	8.2	4.8. Phenotypes are often Affected by More Than One Gene	3	Face to Face	-	-	Exam & Report		
	8.3	Lab: Chi-Square Analysis	3	Face to Face	-	-	Exam & Report		
9	9.1	4.10. Expression of a Single Gene May Have Multiple Effects	3	Face to Face	-	-	Exam & Report		
		4.11. X-Linkage Describes Genes on the X Chromosome							
	9.2	4.12. In Sex-Limited and Sex Influenced Inheritance, An Individual's Sex Influences the Phenotype	3	Face to Face	-	-	Exam & Report		
	9.3	Lab: Multiple Alleles inheritance (Blood Groups)	3	Face to Face	-	-	Exam & Report		
10	10.1	4.13. Genetic Background and the Environment may Alter Phenotypic Expression	3	Face to Face	-	-	Exam & Report		
	10.2	Chapter 7: Chromosome Mapping in Eukaryotes 7.1. Genes Linked on the Same Chromosome Segregate Together	3	Face to Face	-	-	Exam & Report		177

	10.3	Lab: Barr Body	3	Face to Face	-	-	Exam & Report		
11	11.1	Chapter 5: Sex Determination and Sex Chromosomes 5.1. X and Y Chromosomes were First Linked to Sex Determination Early in the 20th Century	4		-	-	Exam & Report	131-	150
	11.2	5.2. The Y Chromosome Determines Maleness in Humans	4	Face to Face	-	-	Exam & Report		
	11.3	Lab: karyotyping (Part 1)	5	Face to Face	-	-	Exam & Report		
12	12.1	5.3. The Ratio of Males to Females in Humans is Not 1.0 5.4. Dosage Compensation Prevents Excessive Expression of X-Linked Genes in Humans and other Mammals	4	Face to Face	-	-	Exam & Report		
	12.2	5.5. The Ratio of X Chromosomes to Sets of Autosomes Can Determine Sex in <i>Drosophila</i> 5.6. Temperature Variation Controls Sex Determination in Reptiles	4	Face to Face	-	-	Exam & Report		
	12.3	Lab: karyotyping (Part 2)	5	Face to Face	-	-	Exam		
13	13.1	Chapter 6: Chromosome Mutations: Variation in Chromosomes Number and Arrangement 6.1. Variation in Chromosome Number: Terminology and Origin	5	Face to Face	-	-	Exam	151-	174

		6.2. Monosomy and Trisomy Result in a Variety of Phenotypic Effects						
	13.2	6.3. Polyploidy, In Which More than Two Haploid Sets of Chromosomes Are Present, is Prevalent in Plants 6.4. Variation Occurs in the Composition and Arrangement of Chromosomes	5	Face to Face	-	-	Exam	
	13.3	Lab: Human Disorders	3	Face to Face	-	-	Presentat ion	
	14.1	6.5. A Deletion is a Missing Region of a Chromosome 6.6. A Duplication is a Repeated Segment of a Chromosome	5	Face to Face	-	-	Exam	
14	14.2	6.7. Inversions Rearrange the Linear Gene Sequence 6.8. Translocations Alter the Location of Chromosomal Segments in the Genome 6.9. Fragile Sites in Humans are Susceptible to Chromosome Breakage	5	Face to Face	-	-	Exam	
	14.3	Lab: Discussion & Submission of the <i>Drosophila</i> Experiment	3	Face to Face	-	-	Report	
15	15.1	Chapter 9: Extranuclear Inheritance 9.1. Organelle Heredity involves DNA in Chloroplasts and Mitochondria 9.2. Knowledge of Mitochondrial and Chloroplast DNA Helps Explain Organelle Heredity	6	Face to Face	-	-	Exam	234- 274

	15.2	9.3. Mutations in Mitochondrial DNA Cause Human Disorders 9.4. In Maternal Effect, The Maternal Genotype has a Strong Influence During Early Development	6	Face to Face	-	-	Exam	
	15.3	Lab: Final Exam						

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Lab Report	10	Mendelian & Non-Mendelian Genetics	3	From week 4 to week 14	The report needs to be submitted via e learning
Human Disorder Presentation	10	Mendelian & Non-Mendelian Genetics	3	Week 15	The presentation needs to be submitted via e learning
Midterm Exam	30	Chapters : 1, 3, 4	1, 2 & 3	Dec. 6. 2022	Paper in Campus
Final Exam	50	All the materials	1 ,2, 3, 4, 5 & 6	To Be Announced	Paper in Campus

23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform... etc): Non

24 Course Policies:

A- Attendance policies:

Students are allowed to not attend seven lectures (15%) in the whole semester. In this case, students



must attend every lab weekly. If a student does not attend a lab, then he/she has a maximum number of four lectures to skip.

B- Absences from exams and submitting assignments on time:

If a student does not attend an exam, he/she will get zero grade in that exam, unless he/she shows a medical report that proves he/she could not attend the exam. In this case, a makeup exam will be offered to the student as soon as possible.

C- Health and safety procedures:

Students need to be aware of the basic procedure of laboratory safety. Part of the first lab in the first week of the semester is assigned to teach students these basic laboratory procedures.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

University regulations will be implemented for any cheating attempt, plagiarism, and misbehavior.

E- Grading policy:

70% will be counted for the lectures, and 30% will be counted for the lab.

F- Available university services that support achievement in the course:

The university provides the e learning platform and the technical support.

25 References:

A- Required book(s), assigned reading and audio-visuials:

Klug, Cummings, Spencer, Palladino, Killian 12th Ed. (2020).

B- Recommended books, materials, and media:

Clips and animations posted on the University E-Learning website.

26 Additional information:



مركز الاعتماد
و ضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

Name of Course Coordinator: - Dr. Khaldoun Al-Hadid -----Signature: ----- Date:
Oct.9.2022-----

Head of Curriculum Committee/Department: ----- Signature: ----- ---
Head of Department: ----- Signature: ----- -
Head of Curriculum Committee/Faculty: ----- Signature: ----- -
Dean: ----- Signature: -----