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)**	2023/2024, First Semester	
12	**Other department (s) involved in teaching the course**	Non	
13	**Main teaching language**	English	
14	**Delivery method**	☐Face to face learning ☐Blended ☐Fully online	
15	**Online platforms(s)**	☐Moodle ☐Microsoft Teams ☐Skype ☐Zoom ☐Others……	
16	**Issuing/Revision Date**	Oct.04.2023	

17 Course Coordinator:

Name: Dr. Khaldoun Al-Hadid Contact hours: Sun: 9:30-10:30, Mon: 10:15-11:15

Office number: 208 Phone number: 22203

Email: kalhadid@ju.edu.jo

مركز الاعتماد وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

18 Other instructors:

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

As stated in the approved study plan.

Prerequisite:0304101

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 genetics concepts to explain how phenotypes are transmitted from one generation to another in different organisms including plants, animals, and humans.

B- Students Learning Outcomes (SLOs):

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

SLOs / CLOs	SLO (1) An ability to identify, formulate, and solve broadly-defined technical or Scientific problems by applying knowledge of mathematics and science and /or technical topics to areas relevant to discipline.	SLO (2) An ability to formulate or design a system, process, procedure or program to meet desired needs.	SLO (3) An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgement to draw conclusions.	SLO (4) An ability to communicate effectively with a range of audiences.	SLO (5) An ability to understand ethical and professional responsibilities and the impact of technical and /or scientific solutions in global, economic, environmental, and societal contexts.	SLO (6) An ability to function effectively on teams that establish goals plan tasks , meet deadlines and analyze risk and uncertainty
1. Understand the concepts of DNA and gene as the	X					

unit of inheritance.						
2. Understand the Concept of Mitosis and Meiosis genetically.	X					
3. Understand the concepts and the applications of Mendelian and Non- Mendelian genetics.	X					
4. Understand the concept of sex determination genetically.	X					
5. Understand the basic concepts of cytogenetics and chromosomal aberrations.	X					
6. Understand the basic concepts of extranuclear Inheritance	X					

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	Face to Face	-	-	Exam	37-43

		1.1.Genetics has a Rich and interesting History 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	
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		
5	5.1	**Chapter 4: Extensions of Mendelian Genetics** 4.1. Alleles Alter Phenotypes in Different Ways	3	Face to Face	-	-	Exam	98-129	
	5.2	4.2. Geneticists Use a Variety of Symbols for Alleles	3	Face to Face	-	-	Exam		
	5.3	**Lab: Meiosis**	2	Face to Face	-	-	Exam		
6	6.1	4.3. Neither Allele is Dominant in Complete or Partial, Dominance	3	Face to Face	-	-	Exam		
	6.2	4.4. In Codominance, The Influence of Both Alleles in a	3	Face to Face	-	-	Exam		

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

		7.1. Genes Linked on the Same Chromosome Segregate Together							
	10.3	**Lab: Barr Body**	3	Face to Face	-	-	Exam		
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	131-150	
	11.2	5.2. The Y Chromosome Determines Maleness in Humans	4	Face to Face	-	-	Exam		
	11.3	**Lab: karyotyping (Part 1)**	5	Face to Face	-	-	Exam		
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		
	12.2	5.5. The Ratio of X Chromosomes to Sets of Autosomes Can Determine Sex in *Drosophila* 5.6. Temperature Variation Controls Sex Determination in Reptiles	4	Face to Face	-	-	Exam		
	12.3	**Lab: karyotyping (Part 2)**	5	Face to Face	-	-	Exam		
13	13.1	**Chapter 6: Chromosome Mutations: Variation in**	5	Face to Face	-	-	Exam	151-174	

		Chromosomes Number and Arrangement 6.1. Variation in Chromosome Number: Terminology and Origin 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	-	-	Presentation		
14	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		
	14.2	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 *Drosophila* Experiment**	3	Face to Face	-	-	Report		
15	15.1	**Chapter 9: Extranuclear Inheritance** 9.1. Organelle Heredity involves DNA in Chloroplasts and Mitochondria	6	Face to Face	-	-	Exam	234-274	

		9.2. Knowledge of Mitochondrial and Chloroplast DNA Helps Explain Organelle Heredity							
	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 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	Tuesday, Nov.28. 2023	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-visuals:

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:

Name of Course Coordinator: - Dr. Khaldoun Al-Hadid ----------Signature: --------- Date: Oct.24.2023----------

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