



The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

1	Course title	General Genetics
2	Course number	0304281
3	Credit hours (theory, practical)	3 Credit Hour
	Contact hours (theory, practical)	6 Credit Hour
4	Prerequisites/corequisites	Biology 0304101
5	Program title	Bachelor of Biological Sciences
6	Program code	0304
7	Awarding institution	The University of Jordan
8	Faculty	Faculty of Science
9	Department	Department of Biological Sciences
10	Level of course	Second Year
11	Year of study and semester (s)	First semester 2016
12	Final Qualification	B.Sc. in Biological Sciences
13	Other department (s) involved in teaching the course	None
14	Language of Instruction	English
15	Date of production/revision	First semester 2016

16. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.
 Dr. Khaldoun J. Al-Hadid
 Office No.: 208
 Office Hour: Sunday 10:00 a.m - 11:00 a.m., Monday: 9:30a.m. - 10:30 a.m.
 Email address: kalhadid@ju.edu.jo

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.
 None.

18. Course Description:

As stated in the approved study plan.

This course is divided into three parts. The first part covers Mendelian genetics, the molecular bases of Mendelian genetics and extensions of Mendelian genetics. The second part covers sex determination, sex chromosomes, and chromosome mutations. Finally, the third part covers extranuclear Inheritance. This course includes two lectures and one laboratory session, which includes experiments dealing with mitosis, meiosis, working with *Drosophila*, and karyotyping experiments.

19. 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- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to

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1- Understand the concepts and applications of Mendelian genetics.

2- Understand the concepts and applications of Non-Mendelian genetics.

3- Understand the concept of sex determination genetically.

4- Understand the basic concepts of extranuclear Inheritance.

5- Understand the basic concepts of karyotyping and chromosomal aberrations

6- Gain mathematical and probability skills to solve assignments of real life cases of genetics.

20. Topic Outline and Schedule:					
Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Introduction To Genetics 1.1. Genetics has a Rich and interesting History 1.2. Genetics Progressed from Mendel to DNA in Less Than a Century 1.3. Discovery of the Double Helix Launched the Era of Molecular Genetics	1-2	Dr. Khaldoun Al-Hadid	1	Exam	02-08
Mendelian Genetics 3.1. Mendel Used a Model Experimental Approach to Study Patterns of Inheritance 3.2. The Monohybrid Cross Reveals How One Trait is Transmitted From Generation to Generation 3.3. Mendel's Dihybrid Cross Generated a Unique F ₂ Ratio 3.4. The Trihybrid Cross Demonstrates that Mendel's Principles Apply to Inheritance of Multiple Traits 3.5. Mendel's Work was Rediscovered in the Early Twentieth Century 3.8. Chi-Square Analysis Evaluates the Influence of Chance on Genetic Data 3.9. Pedigrees Reveal Patterns of Inheritance of Human Genetics	3-6	Dr. Khaldoun Al-Hadid	1, 6	Exam	43-55 58-63
Extensions of Mendelian Genetics 4.1. Alleles Alter Phenotypes in Different Ways 4.2. Geneticists Use a Variety of Symbols for Alleles 4.3. Neither Allele is Dominant in Complete or Partial, Dominance 4.4. In Codominance, The Influence of Both Alleles in a Heterozygote is Clearly Evident 4.5. Multiple Alleles of a Gene May Exist in a Population 4.6. Lethal Alleles Represent Essential Genes 4.7. Combinations of Two Gene Pairs With Two Modes Of Inheritance Modify the 9:3:3:1 Ratio 4.8. Phenotypes are often Affected By More Than One Gene 4.9. Complementation Analysis can Determine If Two Mutations Causing a Similar Phenotype are Alleles of the Same Gene 4.10. Expression of a Single Gene May Have Multiple Effects 4.11. X-Linkage Describes Genes on the X Chromosome 4.12. In Sex-Limited and Sex Influenced Inheritance, An Individual's Sex Influences the Phenotype 4.13. Genetic Background and the Environment may Alter Phenotypic Expression	7-11	Dr. Khaldoun Al-Hadid	2, 6	Exam	72-95
Chromosome Mapping in Eukaryotes 5.1. Genes Linked on the Same Chromosome Segregate Together 5.2. Crossing over Serves a Basis of Determining the Distance between Genes during Chromosome Mapping	12-13	Dr. Khaldoun Al-Hadid	2	Exam	106-112

<p>Chromosome Mutations: Variation in Chromosomes Number and Arrangement</p> <p>8.1. Variation in Chromosome Number: Terminology and Origin</p> <p>8.2. Monosomy and Trisomy Result in a Variety of Phenotypic Effects</p> <p>8.3. Polyploidy, In Which More than Two Haploid Sets of Chromosomes are Present, is Prevalent in Plants</p> <p>8.4. Variation Occurs in the Composition and Arrangement of Chromosomes</p> <p>8.5. A Deletion is a Missing Region of a Chromosome</p> <p>8.6. A Duplication is a Repeated Segment of a Chromosome</p> <p>8.7. Inversions Rearrange the Linear Gene Sequence</p> <p>8.8. Translocations Alter the Location of Chromosomal Segments in the Genome</p> <p>8.9. Fragile Sites in Humans are Susceptible to Chromosome Breakage</p>	13-14	Dr. Khaldoun Al-Hadid	3	Exam	198-216
<p>Extranuclear Inheritance</p> <p>9.1. Organelle Heredity involves DNA in Chloroplasts and Mitochondria</p> <p>9.2. Knowledge of Mitochondrial and Chloroplast DNA Helps Explain Organelle Heredity</p> <p>9.3. Mutations in Mitochondrial DNA Cause Human Disorders</p> <p>9.4. In Maternal Effect, The Maternal Genotype has a Strong Influence During Early Development</p>	15	Dr. Khaldoun Al-Hadid	4	Exam	222-233

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:
Lectures, Discussions, Reports and Projects.

22. Evaluation Methods and Course Requirements:

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

Written exams, reports, and projects.

23. 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 numbers of four lectures to skip.

B- Absences from exams and handing in 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:

Evaluation	Grade
Midterm Lecture Exam	30
Midterm Lab Exam	10
Lab Reports	2
Project	8
Final Lab Exam	15
Final Lecture Exam	35

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

The university provides lab materials and equipment. Moreover, the university provides personnel to help in exams.

24. Required equipment:

1. Centrifuge.
2. Water bath.
3. Refrigerated incubators.
4. Dissecting Microscopes.
5. Compound Microscopes.

25. References:

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

Concepts of Genetics. *Klug, Cummings, Spencer & Palladino 10th Ed.* (2012). Pearson

B- Recommended books, materials, and media:

Genes in Medicine. Istvan Rasko and C. Stephen Downes.

26. Additional information:

Name of Course Coordinator: الدكتور خلدون الحديد Signature: ----- Date: 12/ 01/ 2016

Head of curriculum committee/Department: الاستاذة الدكتورة سوسن العوران Signature: -----

Head of Department: الدكتورة هناء العبوس Signature: -----

Head of curriculum committee/Faculty: الاستاذة الدكتورة أمل العابودي Signature: -----

Dean: الاستاذ الدكتور صالح محمود Signature: -----

Copy to:

Head of Department
Assistant Dean for Quality Assurance
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