



# Course Specification

## (Bachelor)

**Course Title:** Genetics

**Course Code:** BIOL351

**Program:** Biology

**Department:** Biology

**College:** College of Science

**Institution:** Majmaah University

**Version:** 3 rd

**Last Revision Date:** 20/12/2023



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## A. General information about the course:

### 1. Course Identification

#### 1. Credit hours: (3 (2+1) )

Equivalent to ECTS Credit Points: 4.5

#### 2. Course type

A. University College Department Track Others

B. Required Elective

#### 3. Level/year at which this course is offered: 5<sup>th</sup> / 3<sup>rd</sup>

#### 4. Course General Description:

The course aims to teach students key genetic concepts, including Mendelian and modern genetics, DNA structure and replication, alleles, sex-linked inheritance, and sex determination. It also covers chromosome aberrations, different types of mutations, and introduces epigenetics as heritable changes in gene expression.

#### 5. Pre-requirements for this course (if any):

BIOL 102

BIOL 111

#### 6. Co-requisites for this course (if any):

N/A

#### 7. Course Main Objective(s):

The course aims to help students understand how traits are inherited, analyze family pedigrees to observe patterns of inheritance, and explore how genes interact with one another. It also introduces genetic variations and explains how these changes spread and persist within populations.

### 2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	80%
2	E-learning	15	20%
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>	--	--
4	Distance learning	--	--





### 3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
<b>Total</b>		<b>60</b>

### Workload (based on the academic semester)

No	Activity	Workload (in hours)
1.	Contact Hours	60
2.	Self-Study hours or Academic learning hours ( Assessment, quizzes, reports, discution , Library,research..)	60
<b>Total workload</b>		<b>120 hours</b>
<b>Equivalent to ECTS Credit Points</b>		<b>4.5</b>

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	Gain the basic knowledge how traits are passed from parents to offspring	K3	Lecture – Lectures with discussion	Quizzes' Midterm and final exams
1.2	Understand the mechanisms by which genetic information evolves, resulting in population variation, adaptation, and species evolution.	K3	Lectures, individual and group discussion.	Quizzes' Midterm and final exams
1.3	To explore the basic knowledge about the chemical and structural characteristics of DNA, RNA, proteins, and chromosomes	K3	Lectures, individual and group discussion.	Quizzes' Midterm and final exams
<b>2.0</b>	<b>Skills</b>			





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.1	Predict the results of genetic crosses given known parental genotypes or phenotypes.	S3	Lectures, individual and group discussion.	Quizzes' Midterm and final exams
2.2	Show and apply the Hardy-Weinberg equation for calculating genotype frequencies within a population.	S3	Lectures, individual and group discussion.	Quizzes' Midterm and final exams
2.3	Illustrate and employ chi-square analysis to assess the alignment of expected outcomes with predicted results.	S3	Lectures, individual and group discussion.	Quizzes' Midterm and final exams
2.4	Examine the living specimen, slides and instrument in the biological samples.	S4	Practical Sessions	Practical's exam, Lab reports
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	Exhibit responsibilities to accomplish individual activities and effectively plan and prepare the scientific reports.	V2	Discuss about the subject with the student and ask them to write about the subject.	Assignments, Homework, Presentation
3.2	Communicate, manage tasks, and participate the activities related to training and community work.	V2	Discuss about the subject with the student and ask them to write about the subject.	Assignments, Homework, Presentation

### C. Course Content

No	List of Topics	Contact Hours
<b>Theory</b>		
1	Study of cell structure	5
2	Mitosis and Meiosis cell division.	5
3	Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross.	5
4	Experiments on epistatic interactions including test cross and back cross.	5





5	Experiments on probability and Chi-square test.	5
6	Determination of linkage and cross-over analysis (through two-point test cross and three point test cross data).	5
	Total	30
	<b>Practical</b>	
1	Principle and utility of microscopy	6
2	Observation of distinguishing features of different eukaryotic cells.	6
3	Practice with Crosses to show percentage of the offspring by using Punnett square.	6
4	Simple genetic problems solving	6
5	Simple Mendelian traits in humans and pedigree analysis.	6
	Total	30

## D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid- term I exam	5th - 6th week	10%
2.	Mid-term II exam	9th -10th week	10%
3.	Quiz, Oral test and Home works	Every two weeks	10%
4.	E exam (online)	11th week	10%
5.	Assignment	12th week	10%
6.	Practical exam	15th week	10%
7.	Final exam	16th week	40%

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

Essential References	Snustad, D. P., & Simmons, M. J. (2015). Principles of Genetics (7th ed.). ISBN: 978-1-119-14228-7.
Supportive References	<ol style="list-style-type: none"> <li>1. Benjamin Pierce, Genetics: A Conceptual Approach, W.H. Freeman and company, 3rd Edition, 2008.</li> <li>2. Hartwell, L., Goldberg, M., Fischer, J., &amp; Hood, L. (2017). Genetics: From Genes to Genomes (6th ed.). McGraw Hill. ISBN-10: 1259700909, ISBN-13: 978-1259700903.</li> </ol>
Electronic Materials	<a href="https://academic.oup.com/genetics">https://academic.oup.com/genetics</a> <a href="https://www.edx.org/">https://www.edx.org/</a>
Other Learning Materials	<a href="https://www.youtube.com/watch?v=8m6hHRIKwxY">https://www.youtube.com/watch?v=8m6hHRIKwxY</a>



## 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom and fully equipped laboratory facilities are available
<b>Technology equipment</b> (projector, smart board, software)	E.podium and smart board facilities are available
<b>Other equipment</b> (depending on the nature of the specialty)	Nil

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Direct assessment
Effectiveness of Students assessment	Program Leader	Direct assessment
Quality of learning resources	Students	Indirect assessment
The extent to which CLOs have been achieved	Faculty	Direct assessment
Other		

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

<b>COUNCIL /COMMITTEE</b>	<b>Biology Department Council</b>
<b>REFERENCE NO.</b>	<b>07</b>
<b>DATE</b>	<b>04/04/1446 - 07/10/2024</b>

