Course Specification
(Bachelor)

Course Title:	Genetics
Course Code:	BIO-1231
Program:	Bachelor of Science in Biology.
Department:	Biology
College:	Science
Institution:	Imam Mohammad Ibn Saud Islamic University (IMSIU)
Version:	01
Last Revision Date:	*Pick Revision Date.*

Table of Contents

A. Course Identification

1. Credit hours: 4 (3 Lectures + 2 Laboratory + 0 Tutorials).
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 3 / Second Year.
4. Pre-requisites for this course (if any)**:** Cell Biology - BIO 113
5. Co-requisites for this course (if any)**:** None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	√	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	45
2	**Laboratory/Studio**	30
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	75

B. Course Objectives and Learning Outcomes

1. Course Description

Course description: This course covers principles of prokaryotic and eukaryotic cell genetics. Emphasis is placed on the molecular basis of heredity, chromosome structure, patterns of Mendelian and non-Mendelian inheritance, evolution, and biotechnological applications. Upon completion, students should be able to recognize and describe genetic phenomena and demonstrate knowledge of important genetic principles.

2. Course Main Objective

This course discusses the principles of genetics with application to the study of biological function at the level of molecules, cells, and multicellular organisms, including humans. After completing of this course, the student will be able: □ To define structure and function of genes, chromosomes and genomes. □ To recognize the biological variation resulting from recombination, mutation, and selection, population genetics. □ To use the genetic methods to analyze protein function, gene regulation and inherited diseases.

3. Course Learning Outcomes

	CLOs	Aligned-PLOs
1	**Knowledge and Understanding**	
K1	To define the mechanisms by which genetic information is transmitted to new cells in the process of cell division and gamete formation.	K1
K2	To describe the molecular mechanisms by which genetic information is transmitted.	K2
2	**Skills :**	
S1	To explain the major extensions and modifications of Mendel's principles of heredity.	S1
S2	To differentiate particularities of bacterial and viral genetics.	S1
S3	To justify how gene pool of a population shapes it and changes with time.	S1-S2
3	**Values:**	
V1	To operate computer programs for analyzing and processing the experimental data.	V1
V2	To operate laboratory instruments and computers.	V3
V3	To perform biological experiments and handle various slides during laboratory classes.	V2-V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to genetics • Genetics: the science of heredity. • Mendel's laws of inheritance. • Dominance, dominance relations and recessiveness. • The basics of population genetics. • Sex determination in different organisms and sex-linked characters.	9
2	Structure and Biochemistry of DNA • The chromosome theory of inheritance. • The structure of DNA and the genetic code. • Replication and manipulation of DNA. • Transcription and translation.	6
3	Transmission Genetics • Basic and advanced principles of heredity. • The chromosomal basis of heredity.	9
4	Linkage, Mapping, and Chromosomes • Gene linkage and genetic mapping. Human karyotypes and chromosome behavior.	9
5	Prokaryotic Genetics • The genetics of bacteria and viruses. • Molecular mechanisms of prokaryotic gene regulation.	6
6	Genetic engineering and genomics. • Mechanisms of mutation. • Cancer.	6
Total		45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding**		
1.1	To define the mechanisms by which genetic information is transmitted to new cells in the process of cell division and gamete formation.	Three hours weekly lectures with demonstration tools	Students will be evaluated on their ability to present

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			complete solutions to problem
1.2	To describe the molecular mechanisms by which genetic information is transmitted.	Two hours weekly of laboratory devoted to genetic experiments.	Performance must include class examinations, frequent homework assignments and a final exam. (midterm 1, midterm 2, final lab. exam and final exam)
…			
2.0	**Skills**		
2.1	To explain the major extensions and modifications of Mendel's principles of heredity.	Self-study is an important method for students' learning.	Questions in lectures. Short quizzes and exams.
2.2	To differentiate particularities of bacterial and viral genetics.	Introduce some concepts • Motivate students to work cooperatively with their class mates to develop individual skills.	Participation through class work and homework.
2.3	To justify how gene pool of a population shapes it and changes with time.	Encourage Students to communicate their biology thinking to ask and answer question when they arise.	Participation through Class work and Homework.
3.0	**Values**		
3.1	To operate computer programs for analyzing and processing the experimental data.	Lectures delivered in traditional manner and/or visualized using electronic devices	Evaluating the laboratory written reports and calculation skills.
3.2	To operate laboratory instruments and computers.	Virtual labs.	Laboratory performance and reports.
3.3	To perform biological experiments and handle various slides during laboratory classes.	Demonstrations.	Laboratory performance and reports.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm 1	Around 6th -7th week	15%
2	Midterm 2	Around 11th -12th week	15%

#	Assessment task*	Week Due	Percentage of Total Assessment Score
3	Quizzes, Attendance, Participation, Home works.	All the semester	10 %
4	Lab reports.	All the semester	5%
5	Lab Exam.	Around 15th week	15 %
6	Final Exam.	Around 15th -16th week	40 %
7	Total		100%
8			

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :
Personal office hour.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Hartl, D L (2011): Essential Genetics, A Genomics Perspective. 5th edition. Sudbury, MA: Jones and Bartlett Publishers. ISBN: 978-0-7637-7364-9 / 0-7637-7364-6 • Robert j.Brooker- Gentics ,(2008): analysis and principles , edition 3. ISBN 13:9780077229726. • Griffiths, Anthony J. F., Jeffrey H. Miller, David T. Suzuki, Richard C. Lewontin, and William M. Gelbart (2000): An Introduction to Genetic Analysis. 7th ed. New York: W. H. Freeman, ISBN: 9780716735205.
Essential References Materials	http://ocw.mit.edu/courses/biology/7-06-cell-biology-spring-2007/syllabus
Electronic Materials	http://ocw.mit.edu/courses/biology/7-03-genetics-fall-2004/index.htm http://ocw.mit.edu/courses/biology/7-03-genetics-fall-2004/lecture-notes/
Other Learning Materials	Genetics software and CDs for genetics syllabus.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Each classroom is equipped with PC and retro projector with a maximum of 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	The computers are equipped with different software's.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Specific laboratory equipment for this course including posters, models of different experimental animals, dissection instruments, light microscopes, dissection microscopes, microtome instrument, slide preparations, mixer, gel electrophoresis, thermocycler for ampliphication centrifuges, incubators, ovens and other glass wares.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
At the end of the course each student will complete an evaluation form which it will be used by the faculty to evaluate the course feedback and the instructor.	Students	Direct
At the end of each semester the course coordinator completes a report, including a summary of student questionnaire responses appraising progress and identifying changes that need to be made if necessary.	Course coordinator	Direct
Reviewing the course reports submitted at the end of each semester.	Peer Reviewer	Indirect
Follow up of faculty members by specialized committees devoid of bias and criticism.	Specialized committees	Indirect
Check a sample of marking by independent faculty member.	Faculty	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Head of biology department
Reference No.	
Date	