



## SYLLABUS

Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level	Teaching Language
BIO	231	Genetics	4	3	2	0	4-6	BIO 113	3	English

### A. 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.

### B. Course Outcomes

At the end of this course the student will be able to:

1. To define structure and function of genes, chromosomes and genomes.
2. To recognize the biological variation resulting from recombination, mutation, and selection, population genetics.
3. To use the genetic methods to analyze protein function, gene regulation and inherited diseases.

### C. References:

#### Required Textbook

- *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- Genetics ,(2008): analysis and principles ,* edition 3. ISBN 13:9780077229726.

#### Other references:

- *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.

**Course Website:** Google Classroom Webpage: <http://www.imamm.org/>

### D. Topics Outline

#### D1. Lectures topics

1. **Introduction to 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.
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.



3. **Transmission Genetics:** Basic and advanced principles of heredity. The chromosomal basis of heredity.
4. **Linkage, Mapping, and Chromosomes:** Gene linkage and genetic mapping. Human karyotypes and chromosome behavior
5. **Prokaryotic Genetics:** The genetics of bacteria and viruses. Molecular mechanisms of prokaryotic gene regulation.
6. **Genetic engineering and genomics:** Mechanisms of mutation. Cancer.

## D2. Laboratories topics

1. Overview of lab projects, video on human genetics.
2. Patterns of Mendelian inheritance.
3. DNA extraction from epithelial cells.
4. PCR amplification of mt DNA.
5. Electrophoresis of the PCR amplicon.
6. Plasmid DNA extraction and spectrophotometry.
7. Restriction analysis of plasmid DNA.
8. Review of lab methods and discussion of paper assignment.
9. Gene regulation– global regulatory cascades.
10. Sequence analysis of cloned DNA.
11. Sequence analysis of cloned DNA LAB.
12. Phylogenetic analysis.
13. Review of lab methods and discussion of paper assignment.
14. General Revision.

## E. Office Hours

Office hours give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

## F. Exams & Grading System

The semi-official dates of the exams for this course are:

- **Midterm 1:** 6<sup>th</sup> or 7<sup>th</sup> week.
- **Midterm 2:** 11<sup>th</sup> or 12<sup>th</sup> week.



- **Quizzes & Homeworks:** During the semester.
- **Final lab. Exam :** 14<sup>th</sup> or 15<sup>th</sup> week.
- **Final Exam :** 16<sup>th</sup> week.

Your course grade will be based on your semester work as follows:

<b>Midterm 1: 15 %</b>	<b>Midterm 2: 15 %</b>	<b>Final lab. Exam: 20%</b>	<b>Final Exam: 40 %</b>
<b>Quizzes, Homework, Attendance &amp; Participation: 10 %</b>			

The grading distribution:

<b>A+</b>	<b>A</b>	<b>B+</b>	<b>B</b>	<b>C+</b>	<b>C</b>	<b>D+</b>	<b>D</b>	<b>F</b>
[95, 100]	[90, 95]	[85, 90]	[80, 85]	[75, 80]	[70, 75]	[65, 70]	[60, 65]	[0, 60]

### G. Student Workload

#	Teaching/Learning activities	Contact hours	Frequency	Total contact hours	Self-study hours	Total self-study hours	Student learning time
5	<b>Lecture</b>	3	15	45	2	30	75
2	<b>Tutorial</b>	0	0	0	0	0	0
0	<b>Lab\practical</b>	2	15	30	1	15	45
5	<b>Homework</b>	0	4	0	2	8	8
4	<b>Quiz</b>	0.5	2	1	1	2	3
6	<b>Midterm</b>	1.5	2	3	5	10	13
7	<b>Final Exam</b>	2	1	2	12	12	14
<b>Total</b>				<b>81</b>		<b>77</b>	<b>158</b>



The independent self-study is approximately 5 hours per week.

## H. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. (“Immediate family” is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

## [Executive Rules for Study Regulations and Exams](#)

[goo.gl/ykm7t3](http://goo.gl/ykm7t3)

