

SYLLABUS

Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level	Teaching Language
BIO	113	Cell Biology	2	1	2	0	4	BIO 101	2	English

A. Course Description

This course deals with the biology of cells of higher organisms: The structure, function, and biosynthesis of cellular membranes and organelles; cell growth and oncogenic transformation; transport, receptors, and cell signalling; the cytoskeleton, the extracellular matrix, and cell movements; regulation of cellular division.

B. Course Outcomes

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

1. To recognize the structures and functions of cells from lower to higher organisms.
2. To know the method of biosynthesis of cellular membranes and organelles.
3. To define the abnormal cases of transformations such as oncogenic transformation.
4. To outline the language of identification between different cells.
5. To memorize the importance extracellular matrix and nuclear structure inside each kind of cells.

C. References:

Required Textbook

- Bruce Alberts et al., Essential Cell Biology, Third edition, London, UK. (2009). ISBN-13: 978-0815341291.
- Lodish, et al. Molecular Cell Biology. 5th ed. New York, NY: W.H. Freeman and Company, (2003). ISBN: 9780716743668.

Other references:

- <http://ocw.mit.edu/courses/biology/7-06-cell-biology-spring-2007/syllabus/>
- Text Book of Cytology and Histology, Riad, N. and Fares, N., Dar Al Maaref Publishers, Cairo, Egypt
- Saudi biological science publications.
- International publication and magazines of cell biology
- <http://legacy.saylor.org/bio301/Intro/>
- <http://ocw.mit.edu/courses/biology/7-06-cell-biology-spring-2007/syllabus/>
- <http://extension.berkeley.edu/search/publicCourseSearchDetails.do?method=load&courseId=41571>

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

D. Topics Outline

D1. Lectures Topics

1. What is cell biology, properties and behaviors of cells.
2. Structure of biological membranes, lipids and lipid modification and membrane proteins.

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- Pumps, channels, transporters. Receptors, basics of signal transduction
3. Endoplasmic reticulum & Ribosomes, Type and function. Golgi apparatus, Protein secretion, biogenesis of membrane proteins .
 4. Mitochondria and plastids and chemical photosynthesis and respiration. Protein modifications and intracellular transport, glycosylation, vesicular transport, receptor mediated endocytosis, lysosomes, organelle biogenesis.
 5. Nucleus and its components, Regulation of the cell division cycle and regulation of DNA replication.
 6. Regulation of mitosis, meiosis and cell cycle checkpoints.
 7. The extracellular matrix, the actin-myosin & microtubule cytoskeleton.
 8. Signal transduction: Detailed molecular mechanisms.
 9. Nerve cells, ion channels, synapse, Ca^{++} regulated events.

D2. Laboratories Topics

1. **Introduction**, Safety and Laboratory, Introduction to Cytology
2. Study of the ultrastructure's organelles of eukaryotic and prokaryotic cells.
3. Cellular division and their types.
4. Cellular biochemical components
5. Cellular organelles.
6. Differential white cell count
7. Acid phosphatase kinetics.
8. Isolation of erythrocyte membrane proteins.
9. Analysis of erythrocyte membrane proteins.
10. Chloroplasts and the Hill reaction.
11. Electron microscope.
12. Cell culture: basic techniques population curve.
13. Cell culture: population curve (cont.)
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:** 6th or 7th week.

- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homework:** During the semester.
- **Lab exam:** 15th week.
- **Final Exam:** 16th week.

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

Midterm 1: 15 %	Midterm 2: 15 %	Lab exam: 20 %	Final Exam: 40 %
Quizzes, Homework, Attendance & Participation: 10 %			

The grading distribution:

A+	A	B+	B	C+	C	D+	D	F
[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	Lecture	1	15	15	2	30	45
2	Tutorial	0	0	0	0	0	0
0	Lab\practical	2	15	30	1	15	45
5	Homework	0	4	0	2	8	8
4	Quiz	0.5	2	1	1	2	3
6	Midterm	1.5	2	3	5	10	13
7	Final Exam	2	1	2	12	12	14
Total				51		77	128

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](#)

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