Name of the module: Molecular Biology of the cell

Number of module: 471-8-2002

BGU Credits: 6

ECTS credits:

Academic year: 2

Semester: 1

Hours of instruction:6 hours/week frontal lecture, 8 hour/semester tutorial

Location of instruction: Lectures and Tutorials in rooms in the Deichmann Building of the Medical Faculty as scheduled.

Language of instruction: Instruction is in Hebrew and English. Reading and Guidelines in Hebrew and English. Student submitted material in Hebrew and English.

Cycle: MD students

Position: Basic course. A passing mark is obligatory for students in the MD program.

Field of Education: Molecular Biology sub-discipline of Biochemistry

Responsible department: Shraga Segal Department of Microbiology, Immunology and Genetics

General prerequisites: Biochemistry A+B, Cell Biology

Grading scale: Percentage, with 65% passing mark.

Course Description: A combination of frontal lectures and tutorials sessions that teach the fundamentals of molecular biology in theory and practice.

Aims of the module: The purpose of the module is to teach the basic cellular machinery involved in information-processing pathways and exposed students to Molecular and cell Biology issues at the forefront of science.

Objectives of the module: each student will: 1. Study the basic principles of the various DNA and RNA transactions in prokaryotic and eukaryotic cells. 2. Study the various concepts of regulation of gene expression in cells. 3.be exposed to advanced molecular and cell biology issues and understand the use of advanced Molecular Biology tools in medicine, medical research and medical laboratory diagnostics .

Learning outcomes of the module: On successful completion of the course, the student should be able to:

1. Recount the basic mechanism and components involved in information processing in the cell.
2. Discuss the ways in which these processes differ between prokaryotes and eukaryotes.
3. Give concrete examples taken from cell-and organism-level processes and human diseases that illustrate these molecular mechanisms.

Attendance regulation: Tutorial assignments are mandatory.

Teaching arrangement and method of instruction: An integrated set of frontal lectures in a classroom setting, tutorials, and tutorial assignments for each of the teaching units should be submitted by the students a week after the last lecture of the teaching unit. Frontal tutorial lectures given by teaching assistants after the completion of consecutive teaching units thus providing constant feedback on student progress.

Lecturers and coordinators: Prof. Esther Priel
Lecturers: Dr. Dan Levi, Dr. Alex Braiman, Prof. Etta Livneh, Prof Gopas Jacob, Prof. Noah Isakov
Contact details:
Priel: Office phone: (08) 6477254
Email: priel@bgu.ac.il
Office hours: On an ad hoc basis, Sundays to Thursday, 9:00 am to 5:00 pm.
Module evaluation: Organized yearly feedback from students at end of semester. Periodic review by academic committee.
Confirmation: the syllabus was confirmed by the faculty academic advisory committee to be valid on XXX (academic year)
Last update: 2015

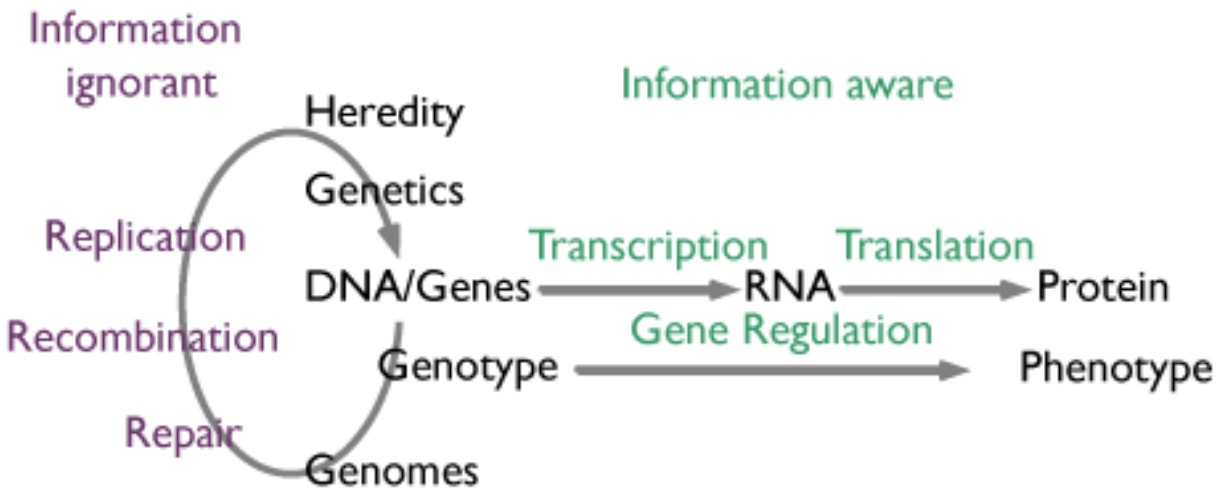
Assessment:

1. Final exam, 90%
2. Tutorial assignments 10%

100%

Work and assignments: Students are briefed on the course work, including weekly assignments, at the beginning of the year.
Time required for individual work: Reading, lab-related work, and material review is estimated requiring 3 to 4 hours/week.

Module Content\ schedule and outlines: The basic molecular processes involved in information processing in the cell are presented to the students in an integrated format in a single diagram (below) referred to throughout the module.



The time spent (hours) on each of the topics (frontal lectures only), in the order shown, is as follows:

Teaching unit: Topics (hrs)

1. Introduction-
2. The human genome in health and sickness: Part I, an anatomy of information(4)
   (Basic material,DNA kinetics, basic information in Chromosome structure
   Genome variations within human populations)
3. Nucleus structure (2)
4. Advanced topics in DNA structure and DNA topology and Chromosome structure in bacteria and in human cells- DNA topoisomerases as targets for anti-cancer drugs and antibiotics (3)
5. DNA replication in human cells (3)
6. The end replication problem, telomerase and matching the DNA replication process to the cell cycle (2)
7. Genome Fluidity: Recombination (Homologous recombination, Site specific recombination, Transposition)(4)
8. Transcription and regulation of transcription in prokartotes and eukaryotes (8)
9. Epigenetics (2)
10. Mutation, DNA damages, DNA repair pathways and relevant diseases (6)
11. Endocytosis (2)
12. Signal transduction (4)
13. Advanced topics in cell cycle and differentiation (6)
14. Advanced topics in protein synthesis regulation (2)
15. Apoptosis and cell-cell communications (4)
16. Oncogenes (4)
17. The genome in sickness and health: Part II, diagnosis (genome instability, diagnosing genome variations, diagnosing changes in expression (4)
18. Genetic Engineering: Clone me a gene (4)
19. The future: Genotype to phenotype (2)

Required reading: **Lehninger: Biochemistry**, current editions. **Darnell: Molecular Cell Biology**, Current edition

Additional literature: **Cooper: The cel**l and **Gilbert: Development**, current editions.

*** All learning material will be available to the students on the module's website (high-learn)/ library/ electronic documents available to BGU students.**