The Hebrew University of Jerusalem

Syllabus

INTRODUCTION TO MOLECULAR BIOLOGY - 71065

Last update 20-08-2018

HU Credits: 3

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Plant Science in Agriculture

Academic year: 0

Semester: 1st Semester

Teaching Languages: Hebrew

Campus: Rehovot

Course/Module Coordinator: Ofer Idlin Harari

Coordinator Email: ofer.aidlinhara@mail.huji.ac.il

Coordinator Office Hours: Sunday 0900 : 1000

Teaching Staff:

Prof Shai Morin
Prof Alexander Vainstein
Mr.
Ms. Jasmin Ravid
Ms.
Mr.
Ms.

Course/Module description:

Chemistry and structure of nucleic acids. Mechanisms of DNA replication and repair. Methods in molecular biology (stage I). Chromosome and nucleosome structures. Transcription in prokaryotes and its regulatory elements. Transcription in eukaryotes: transcription regulation by promoter elements,transcription factors and enhances. Transcription regulation via promoter methylation (epigenetics). Post transcription processing of mRNA. Post-transcription gene silencing. Components of the translation complex: ribosomes and tRNA. Description of the translation process in prokaryotes and eukaryotes. Introduction to genomics and genetic engineering: methods, processes, abilities and their outcome.

Course/Module aims:

The course goal is to provide the students with basic knowledge in molecular biology, genomics and genetic engineering. The knowledge will allow the reading of up-to-date literature and detailed understanding of topics in advanced courses in future studies.

Learning outcomes - On successful completion of this module, students should be able to:

To define the major processes in the central dogma of molecular biology (from DNA, through RNA to protein)
To evaluate measurement and identification techniques for nucleic acids and proteins - advantages and disadvantages
To identify and classify cell components involved in DNA and RNA synthesis
To design simple experiments for detection of DNA modifications (mutations)
To read and interpret scientific papers that utilize molecular biology technologies

Attendance requirements(%):

None

Teaching arrangement and method of instruction: Lecture, exercise,

Course/Module Content:

Introduction and history of molecular biology. DNA and RNA structure
The central dogma in molecular biology. The genetic code. Mutations.
Protein synthesis
DNA replication, recombination and repair
From DNA to RNA in prokaryotes
Classic analytic methods in molecular biology
Isolation of nucleic acids
Chromosome and nucleosome structure
Transcription control in eukaryotes
mRNA processing
Gene silencing
Introduction to genomics and proteomics. Biotechnological applications.

Required Reading:

Genes X/ Lewin, Benjamin
10th ed. Jones & Bartlett publishers, 2011

Additional Reading Material:

None

Course/Module evaluation:

End of year written/oral examination 90 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 10 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:

None