



The Hebrew University of Jerusalem

Syllabus

GENETIC ENGINEERING - 71184

Last update 07-05-2024

HU Credits: 3

Degree/Cycle: 2nd degree (Master)

Responsible Department: Genetics & Breeding

Academic year: 0

Semester: 2nd Semester

Teaching Languages: English

Campus: Rehovot

Course/Module Coordinator: Shilo Rosenwaser

Coordinator Email: shilo.rosenwaser@mail.huji.ac.il

Coordinator Office Hours:

Teaching Staff:

Prof. Sivan Berta,
Prof. Hanokh Czosnek,
Dr. Shilo Rosenwaser

Course/Module description:

History and current applications of genetic engineering. Tool box for genetic modifications. Reading, writing and editing DNA. Cloning and DNA assembly. Synthetic biology, gene circuits and components libraries. Protein design. Genetic modifications of plants, yeast and animals. Real world problems: positional effects, trait stacking, silencing and environmental interactions. genetic engineering in animals; CRISPR; transgenic mice

Course/Module aims:

Introduction to technologies and philosophy of genetic engineering of living organisms.

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

Understand and analyse up to date research.

Attendance requirements(%):

Teaching arrangement and method of instruction: lecture and exercises

Course/Module Content:

Muagenesis: chemical, enzymatic, zinc fingers, TALENs – Overproduction of foreign proteins in bacteria: plasmid and phage expression vectors - Genetic engineering in yeast: transformation vectors, expression of foreign proteins, protein-protein interaction.

Sequencing (from Sanger to third generation high throughput sequencing),

DNA sequencing applications (whole genome sequencing),

Plant transformation via *Agrobacterium*

Transgenic plant in research and agriculture,

CRISPR (background and application),

Required Reading:

relevant scientific publications

Additional Reading Material:

Grading Scheme:

Written / Oral / Practical Exam 100 %

Additional information: