2021-2022

**Genetic Engineering – 223.3026
Semester B**

**Instructor:** [Professor] [Fuad] [Fares], **Email:** [ffaares@univ.haifa.ac.il]

**Office Hours:** [Wednesday] [12-14], Room [74], [048288781]

**Course Level:** (BA)

**Course Type & Format:** [Elective],[Lecture]

**Number of Hours/Credits: 2**

**Prerequisites:** Cell Biology, Genetics, Molecular Biology

**Course Overview (Short Abstract):**

The course will expand students' understanding of the genetic engineering methodology. In addition, during the course the main applications of genetic engineering will be presented in basic science, biotechnology and medicine.

The course will focus on the following topics: DNA structure and replication, gene cloning, DNA transformation, gene expression in prokaryotic and eukaryotic cells, recombinant proteins, protein structure and function using a site-directed mutagenesis and gene transfer, transgenic animals, animal cloning, transgenic plants and the use of genetic engineering methods in medicine to diagnose and treat human diseases.

**Learning Outcomes (What are the skills, abilities, or major concepts a student is expected to acquire in this course?) – At the end of the course students will be able to:**

1. Recognize the methodology that used in Genetic Engineering; Gene cloning, transformation, site-directed mutagenisis, gene expression, transgenic animals and plants.
2. Understand the efficacy of genetic engineering methods in basic research, in Biotechnology and in medicine.

**Assessment (Assessment Method and Grade Composition):**

[Exam], [100]%

**Week-by-Week Content and Assignments:**

|  |  |  |
| --- | --- | --- |
| **Week #** | **Topic** | **Assignment**  |
| 1 | Introduction to genetic engineering | Power point |
| 2 | DNA replication  | Power point |
| 3 | Gene cloning  |  |
| 4 | Gene transformation | Power point |
| 5 | Site-directed mutagenesis | Power point |
| 6 | Gene fusion | Power point |
| 7 | Gene expression in prokaryotic and eukaryotic cells | Power point |
| 8 | Recombinant proteins | Power point |
| 9 | Designing long-acting recombinant proteins | Power point |
| 10 | Transgenic animals | Power point |
| 11 | Animal Cloning | Power point |
| 12 | Transgenic plants | Power point |
| 13 | The use of genetic engineering methods in clinics | Power point |
| 14 | The use of genetic engineering methods in clinics | Power point |

**Website:** [[Moodel, University of Haifa]](http://online.haifa.ac.il)

**Reading List:**

1. [Harvey Lodish](http://www.amazon.com/exec/obidos/search-handle-url/ref%3Dntt_athr_dp_sr_1?%5Fencoding=UTF8&search-type=ss&index=books&field-author=Harvey%20Lodish), *et al*. Molecular Cell Biology.9th Edition, 2021
2. Samdrook, G., Fritsh ES, and maniatis T, Molecular Cloning: A Laboratory Manual. 4th Edition, 2012