Biological Regulation in complex systems 227.4018

Semester A

Time: Thursday 10:00-12:00

Instructors:
Smadar Ben-Tabou de-Leon sben-tab@univ.haifa.ac.il

Office Hours:
Tuesday 10:00-12:00 Multipurpose building room #133.

Course Type: Frontal lectures

Course Level: M.Sc. and 3rd year B.Sc

Pre-Requisites: Genetics, Cell biology

Course Overview: The course will discuss the various molecular mechanisms that regulate differential gene expression, cell fate specification and the formation of complex embryonic morphologies. The course will present the different levels of transcriptional regulation, from cis-regulatory modules that control gene expression in time and space, through regulatory circuits that contain typical network motifs with a specific function, to gene regulatory networks that control cell fate specification. Additionally, it will present whole genome studies of gene expression profiles and global regulatory networks. The subject would be introduced through up to date experimental examples based on recent studies in different model systems, especially the sea urchin embryo.

At the end of the course students will be able to: [Learning Outcomes]

1. Be familiar with various levels of the regulation of gene expression.
2. Understand the logic of the different transcriptional regulation levels from cis-regulatory control, to the structure of control circuits to the connectivity of gene regulatory networks.

3. Be able to critically read and assess the validity of current scientific papers.

**Requirements**

80% attendance

Presentation of one scientific papers that studies transcriptional gene regulation.

Written review of a scientific paper on transcriptional gene regulation.

**Grading:**

30% - Paper presentation

70% - Written review

**Website:** Moodle

**Reading List:** Various papers about different aspects of gene regulation (papers are downloadable from moodle).