

סמסטר: \_ב תשפ"א : 2020-21

**Name of course:** Research Seminar on Symbiosis in Aquatic Systems (2 points)

**Course number:** 227.4062

**Lecturer:** Dr. Laura Steindler, Department of Marine Biology

**Reception hour:** By appointment (set appointment by email)

**Email contacts:** [lsteindler@univ.haifa.ac.il](mailto:lsteindler@univ.haifa.ac.il)

**Aim of the course:**

The capabilities that eukaryotes gain due to symbioses with other organisms are diverse including, among other benefits, improved nutrition, defense against natural enemies, and an ability to adapt to a variety of environments. In this seminar-course we will use the definition of symbiosis by de Bary (1879): 'the living together of differently named organisms', regardless of the impact of the association on the host: positive, negative or indifferent. In fact, it is now recognized that there is a very 'thin line' between a pathogenic and a symbiotic interaction, both governed by similar rules and taking advantage of similar molecular and cellular mechanism, yet with contrasting effects on the host. We will mostly focus on aquatic symbioses; however, we will discuss the shared and different aspects with the better studied terrestrial interactions.

The first two classes will be frontal, providing an overview of the 'hot topics' in symbiosis. The following classes will be in a seminar-format that promotes active learning by engaging the students with course material through discussions of the relevant literature. Each class will relate to a specific topic (see examples in the list below), where one student presents a key-research paper as seminar, and the seminar is followed by a discussion. The other students bring up what they learned from different papers that relate to the same topic, that they need to read during the week before class (articles will be provided through the moodle each week). The discussion aims at cross-analyzing the specific topic throughout different symbiosis model-systems.

The number of research topics that will be discussed depends on the number of students registered to the seminar-course. At the end of the course, the students will be divided in two groups and will be given a research question that they should address, proposing the methodological approaches they would use based on what they learned throughout the course. Each group will work together on this project (at campus or on zoom, according to corona rules by then) during two classes. Thereafter, the groups will present their ideas to the class in the last meeting of the course.

**Discussion topics (examples):**

- What defines the intimacy of symbiosis
- The thin line between symbiosis and pathogenicity
- Symbiont transmission
- Inter-partner recognition
- Innate immunity in symbiosis
- Genome streamlining in symbionts
- What happens to symbionts outside their host?
- Metabolite transfer between host and symbionts
- Microbiomes for biotechnology
- Unexplored symbioses (ciliates, fungi, viruses)
- Marine versus terrestrial symbioses
- Holobiont/hologenome as a unit of selection

**Requisites for the course:**

Participation to all the classes is mandatory.

**Reading material:**

Reading material (research articles) will be made available to the students through the Moodle.

**Final composition of grade:**

Seminar and discussions: 70%

Final group project: 30%