Introduction to Dryland Ecology. 001-2-1103 (4 Credits)

Weekly Lecture Hours	Exercise	Laboratory	Field Trip
3			4 trips

Course description and objective:
Ecology is the scientific study of the interactions between organisms and their environment and among organisms, which determines their distribution and abundance. Ecology deals with all hierarchical levels starting from the individual organism up to the whole ecosystem. It is thus very broad and includes various sub-disciplines, including behavioral ecology, physiological ecology, evolutionary ecology, population ecology, conservation ecology, genetic ecology, immunoecology, community ecology, disease ecology, spatial ecology, landscape ecology, and macroecology. Yet, the ecological terms and hypothesis-driven approach distinct this discipline from others. The environment and organisms surrounding us influence our daily life. Moreover, ecology has important applications for conservation, biological control, and human health. ***Thus, understanding ecological patterns and mechanisms are central to our life.***

The goal of this course is to expose students from different disciplines to the scientific approaches in ecology, its tools and main concepts and topics. Deserts take up about one third of the Earth's land surface and have unique features that affect the ecology of organisms. Thus, throughout the course this special ecosystem will be used as a model for studying the different ecological concepts.

Detailed description of course units:

1. **Introduction:** First introduction to ecology and to the course. Requirements and expectations from the course; the uniqueness and significance of ecology and its relation to other disciplines in the life sciences.
2. **Evolution and its link to ecology:** Basic principles in evolution; ecological terms at the individual level derived from evolutionary principles.
3. **Population growth:** The characterization of populations; population dynamics of unlimited and limited populations.
4. **Composition and distribution of populations across time and space:** Age structure; habitat; ecological niche; distribution of organisms within and between habitats.
5. **Interspecific interactions in general and competition in particular:** The various interspecific interactions; definition of competition and its occurrence in nature; Lotka-Volterra model.
6. **Exploitative interactions in general and predation in particular:** The various exploitative interactions; numerical and functional responses; behavioral responses; predator-prey coevolution.
7. **Mutualism:** Definitions, characteristics and examples; the mutualist conflict; the evolution of mutualism.

8. **Food webs:** Definitions of a food web and trophic levels; characteristics; factors affecting the structure and stability of food webs.
9. **The structure and function of communities:** some definitions related to the community; spatial organization of communities; community structure and function.
10. **Macroecology:** Biogeography; global biodiversity patterns.
11. **Ecosystem and landscape ecology:** characteristics, energy flow, nutrient cycling
12. **Applied ecology:** The use of ecological principles for biological control, medicine, and conservation biology
13. **Course summary and presentations of projects**

Assessment of students and structure of final grade:

Exercises	40%
Participation in class and discussion	10%
Research proposal on an ecological topic related to the discipline of the student	50%

Lecturer: Hadas Hawlena

Recommended Readings: Smith, T.M and Smith, R.L. 2009 (7th edition). Elements of Ecology. Benjamin Cummings, New York.
The relevant article list will be provided during the course.