



Introduction to Ecology

Principles of Ecology and its relation to Human Society

Fall 2017

Lecturer: Dr. Elli Groner

1.5 academic hours twice a week, 3 credits **Undergraduate**

Course purpose

Students will be taught the basic terminology, principles and ideas of ecology. The course will introduce the basic ideas and history of the science, its evolution and links to other sciences. Subsequent lectures will examine these ideas looking at different ecological scales: individuals, populations, communities and ecosystems. Human ecological issues will also be discussed where relevant within the framework of the course, with a special emphasis on ecosystem integrity and ecosystem services. Case studies will be brought from the Arava valley and 2 trips will help study the local region. A Biodiversity project will be done in pairs, teaching students the ability to deal with real data. The students will need to breed plants and beetles to study population tables.

Grade components:

- Attendance, participation, discussions 10%
- Quizzes, exercises, 20%
- Mid-term exam 5%
- Trip reports 5%
- Biodiversity project 20%
- Final exam 40%

Reading, assignments, exercises & practical

Q	Reading quizzes	At the beginning of each class a question will be posed based on the reading set for the coming lesson. The reading is required to understand the lesson.
E	Exercise	Homework on the material already taught. This should be done in pairs and submitted the next week. The exercise allows students to practice the material that was taught.
D	Discussion	Discussion in class on the taught topic and human impact upon it
P	Practical	Hands-on demonstration of an example from the taught topic.
BD	Biodiversity project	Done in pairs, submitted as a paper and 10 min talk
MTE	Mid-term exam	Exam in week 6 on material from weeks 1-5

FE Final exam Exam on material from all the semester

Textbooks for course

Ecology: Individuals, Populations and Communities / M. **Begon**, J. Harper, C. Townsend. Blackwell Science LTD, Oxford, UK 2nd edition.

Or

Ecology: Concepts and Applications / M. C. **Molles** Jr. 2002. McGraw-Hill Higher Education, NY, USA (2nd edition). Only for UG.

Recommended Reading:

- Evolution - Mark Ridley, Blackwell publishing
- Animal ecology - Charles Elton, new edition, University of Chicago press
- Human ecology – Basic concepts for sustainable development. Gerald G Marten. Earthscan Publishing, 2001.

Schedule:

Session #	Discipline	Topic
1	Intro	Intro
2	Evolution 1	Evolution 1
3	Behaviour	Optimal Foraging
4	Community 1	Biodiversity 1
5	Populations 1	Life History
6	Populations 2	Population Growth
7	Populations 3	Carrying Capacity
8	Populations 4	Distribution
9	Community 2	Biodiversity 2
10	Community 3	Competition
11	Community 4	Predation
12	Desert Ecology	Desert Ecology Intro
13	Arava Trip	Ecology Trip
14	Community 5	Paratizism And Mutualistic
15	Ecosystem 1	Ecosystem Ecology
16	Ecosystem 2	Ecosystem Integrity
17	Desert Ecology	The Negev Ecology
18	Ecosystem 3	Food Webs
19	Ecosystem 4	Ecosystem Services 1

20	Ecosystem 5	Ecosystem Services 2
21	Landscape Ecology	Landscape Ecology
22	Community 6	Biodiversity Presentations
23	Biogeography	Biomes
24	LTSER Research	Research At AIES
25	Summary	Summary
26	Final Exam	

Lessons:

Lesson 1 - Introduction to ecology,

Definition of ecology, the history of ecology, ecology disciplines

Lesson 2, Evolution 1,

The mechanism of natural selection, a simulation of predation's effect on selection, how does natural selection work, sexual selection, artificial selection, human evolution

Readings: Pojta & Springer 1998

Lesson 3, Behavior,

The theory of optimal foraging and ideal free distribution. Exercise of optimal foraging and ideal free distribution.

Lesson 4 Community Ecology 1 biodiversity 1

The biodiversity project explained

Lesson 5, Populations 1 Life history

Life history strategies, r and K strategies, reproduction allocation, The trade-off triangle
Cohort life table cadis fly exercise

Lesson 6 , Population 2 Population growth

The per capita growth rate, The logistic regression equation

Lesson 7 Population 3, carrying capacity

Carrying Capacity, population fluctuations, chaos theory, the logistic regression assumptions

Lesson 8, Desert Ecology 1 - The Arava

The theory of desert ecology, The arava ecology

Readings: Shanas *et al.* 2011

Lesson 9, The Arava ecology trip

Full day trip to the Arava area

Lesson 10, Distributions

Aggregation and even distribution. The aggregation index, exercise of aggregation

Lesson 11 Community Ecology 2 biodiversity 2

The ethical importance of biodiversity, biodiversity and resilience, biodiversity indices, similarity
Exercise: biodiversity of the Arava

Lesson 12, Community Ecology 3 competition

Competition: The Lotka-Volterra model, resource competition, allelopathy, apparent competition

Lesson 13 Community Ecology 4

Predation,

Lesson 14, Community Ecology 5

Mutualism, parasites, parasitoids

Lesson 15 Ecosystem Ecology 1 structure and function

Energy flow, The carbon cycle, the nitrogen cycle, the water cycle

Lesson 16, Ecosystem Ecology 2 , Ecosystem Integrity

Lesson 17 Desert Ecology 2 - The Negev

lesson 18, Ecosystem Ecology 3, Food webs

Trophic interactions, food webs, energy flow

Lesson 19, Ecosystem Services

The link between ecosystem structure and function to ES, provisions, culture and regulator services

Lesson 20, Ecosystem Services 2

Policy and DPSIR model

Lesson 21 Landscape Ecology

Lesson 22 Community Ecology - students presentations

Lesson 23 Biogeography

Lesson 24 LTSER - Socio-ecological research at AIES

Lesson 25 Summary

Lesson 26, Final exam

Readings:

Day	Session #	Topic	Begon 2 nd	Molles	Others
Sun	1	Intro			
Mon	2	Evolution 1	7-9	No	
Sun	3	Optimal Foraging			
Mon	4	Biodiversity 1	611-620	373-383	
Sun	5	Life History			

Mon	6	Population Growth	203-208	261-264	
Sun	7	Carrying Capacity	217-219	263-272	
Mon	8	Distribution	158-177, 541-542	215-236, 483-486	
Sun	9	Biodiversity 2	816-825	503-512	
Mon	10	Competition			
Sun	11	Predation	279-281, 298-305	141-151, 328-345	
Mon	12	Desert Ecology Intro			
Sun	13	Ecology Trip			Ward 1-10
Mon	14	Paratizism And Mutualistic			
Sun	15	Ecosystem Ecology			
Mon	16	Ecosystem Integrity			
Sun	17	The Negev Ecology			
Tue	0	Negev Trip			
Wed	0	Negev Trip			
Thur	0	Negev Trip			
Sun	18	Food Webs	670-685, 701-705	393-429	
Mon	19	Ecosystem Services 1			Sagie et al. 2013
Sun	20	Ecosystem Services 2			
Mon	21	Landscape Ecology			
Sun	22	Biodiversity Presentations			
Mon	23	Biomes			
Sun	24	Research At AIES			
Mon	25	Summary			