Agroecology

Applied Research and the use of Ecosystem Services in Agriculture

Dr. Jessica Schackermann and Dr. Oren Hoffmann

3 weekly hours, 3 academic credits

Course description

This course introduces the concept of agroecology, how ecological understanding can be applied to agricultural systems and how this can lead to new management approaches. The students will discover the differences between agribusiness and agroecology and how the principles of agroecology can be applied to small scale and big scale farms. The course includes 2 field trips and hands on sessions in which the students will use the learned information to improve habitat for service agents.

Course Requirements and Class Structure

Each week consists of 3 hours, which include lectures, student's oral presentations, discussions, short projects in teamwork, presentation of teamwork. The course includes three field trips including hands on lessons. Students will be asked to submit a short report for each of the field trips, do teamwork assignments that will be presented to the class, and present and answer a few questions regarding chosen publications.

Grading components

Attendance and punctuality	15%
Teamwork assignments and presentation of outcomes	20%
Assignment and oral presentation	20%
Field trip reports	15%
Final exam	30%
Total	100%

Recommended books and links for course preparation:

Agroecology: the ecology of sustainable food systems, SR Gliessman, 2014

Essentials of Ecology, 4th Edition, Michael Begon, Robert W. Howarth, Colin R. Townsend
ISBN: 978-0-470-90913-3, 2014

www.agroecology.org, www.agroeco.org , www.ecologyandsociety.org

Week 1 – Dr. Oren and Dr. Jessica
Hour 1: Introduction to the course, the syllabus, expectations, assignments, and field trips.
Hour2: Agroecology, food systems, and interdisciplinarity. The Agroecosystem concept.
Hour 3: Biotic factors and Ecosystem Services to agriculture in an overview.

Week 2 – Dr. Oren
Part 1: Differences between industrial and sustainable agriculture.
Part 2: Conventional and alternative cropping systems. How does an agroecologist look at a cropping system?

Week 3 – Dr. Jessica
Part 1: Biological pest control: predators and parasitoids in the insect kingdom, understanding, and helping beneficial insects.
Part 2: Pollination, honeybees and wild pollinators, the use of flowering strips for pollinators and natural enemies.

Week 4 – (field trip) Dr. Oren and Dr. Jessica
Field trip to the agricultural R&D farm – Science in small scale experimental farms – opportunities and challenges AND eco/ agricultural tourism

Week 5 -Dr. Oren
Part 1: The importance of healthy soil AND Chemicals in agriculture, advantages, disadvantages, limitations and alternatives to chemical control.
Part 2: The crop plant and abiotic factors of the environment.
Teamwork assignment: exploring pathways to sustainable agriculture in the Hyper Arid desert.

Week 6 – Dr. Jessica and Noam
Part 1: Ecosystem services provided by birds – international and local examples (guest lecture by Noam Weiss)
Part 2: Ecosystem services provided by bats – international and local examples AND Integrated pest management (IPM).

Week 7 (field trip 3.5 hours) – Dr. Oren and Dr. Jessica
Field trip to Samar date plantation – organic date farming and its challenges. Research in commercial fields.

Week 8 – Dr. Oren
Part 1: The importance of the landscape, the habitat and their elements in agro-ecosystems.
Part 2: Agriculture within the local landscape and biophysical constrains. Indigenous systems as agroecological labs.

Week 9– Dr. Jessica
Part 1: Insect composition as a key component for pest control and pollination services.
Part 2: Planning of the hands on part of the course, what can we do to enhance ecosystem services to agriculture and gardening?

Week 10 - (hands on field trip) 5 hours – Dr. Oren and Dr. Jessica
Exploring our own "agroecosystem": what services do we wan to enhance? What disservices can we reduce?
Teamwork assignment: Presentation of the different plans and discussion.
Group assignment report.

Week 11 – Dr. Oren
Part 1: Technological approaches to sustainable agriculture: GMO, additives, ag-tech, precision agriculture. What problems are they trying to solve? What problems are they ignoring?
Part 2: 5 Student presentation

Week 12 – Dr. Jessica
Part 1: How can we take scientific results out of the bubble and into the world of agriculture? How applicable is applied research?
Part 2: 5 student presentation and handing out example exam

Week 13 – Dr. Oren
Part 1: Climate change and agriculture: global predictions, local consequences, and personal choices; **and answering questions about example exam**
Part 2: 5 Student presentation

Week 14 – Final exam