

ENV-303 Agroecology Integrated Crop Management

Fall 2021

Instructor: Mairambek Nurgaziev, Associate Professor (PhD)

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Class schedule:

Lecture 09:25 - 10:40 on Tuesday

Seminar 09:25 - 10:40 on Thursday

Course overview:

This is an advanced 6-credit course for students interested in the ecology of agricultural systems, the environmental impacts of crop production, agro-ecology and sustainable agriculture. An agro-ecological approach, the application of ecological concepts and principles for the improvement of cropping systems, is emphasized. Students will gain a more in-depth understanding of inputs and outputs in agricultural systems and their relation to primary productivity, nutrient cycling, energy flows, and species interactions on farms. Topics include agricultural intensification, forestry, agro-ecosystem structure and function, aspects of technology adoption, soil erosion and conservation, tillage systems, weed ecology and management, nutrient dynamics and management, water quality, crop rotation, cropping system diversification.

Learning Objectives:

1. The ecological foundations of agroecology.
2. Application of agroecological concepts to real-life farms.

Evaluation and Assessment:

The students' performance is assessed on the basis of their participation during the lectures, including the familiarity with the reading material, note-taking, making assignments, oral presentations and written exams. Students are expected to pass all the above in order to obtain a credit for the semester.

Examination:

The students will take two exams: the first one is a mid-term test and the second one is an essay-type examination. The test consists of questions on short definitions and multiple-choice questions. Exam papers are composed of essay type questions, which require in-depth answers on the topics studied. No books, papers etc. can be used during the exam. Exam questions are compiled from the questions discussed during the lectures. Evidence of using additional sources of information related to the course content will be marked in the form of additional points for examination paper.

Excuse policy for missed exams and quizzes:

A legitimate reason for missing a quiz or an exam must be presented to the instructor prior to the date of the scheduled quiz/exam. If the reason is acceptable, an alternative quiz/exam will be given before the scheduled exam time, if possible. A student who misses an exam without being previously excused takes the risk that a late excuse may not be accepted. Late exams, when given, will be within one week of the scheduled exam time.

Grading scheme: All grades will be awarded in accordance with the scheme given below. Your points for the class work cannot exceed the maximum of 40.

ASSIGNMENT POINTS

Mid-term test and final examination	20 and 30, total 50 (maximum)
1 presentation and one home or class assignment	10 (maximum for each), total 30
Active participation, note-taking	5 each 2
Bonus for attending classes	10

Withdrawal of grades in case of poor attendance without reason

Minus 5 for each failure to attend

A 100-95	B- 76-71	D+ 47-42
A- 94-89	C+ 70-60	D 41-36
B+ 88-83	C 59-54	D- 35-30
B 82-77	C- 53-48	F < 30

Work and attendance: The work and attendance of all students will be monitored. Students are expected to attend all lectures and seminars. Attendance is regarded as a part of the course. This is for the benefit of the students and helps to ensure that they are coping with the work and managing to comprehend all the information and complete all the tasks given to them. Students must come to class on time not to disturb others, being more than 10 minutes late is counted as an absence. Students are not allowed to use any mobile devices or portable computers in class. Students are not allowed to use any mobile devices or portable computers in class, this is considered as a “negative” participation and participation points be deducted for that.

Documentation of reasons for absence: Any valid reasons for absence should be reported to the Instructor as soon as possible. Legitimate excuses are the following: illness, confirmed by a doctor's note next class; a death in the family; participation in conferences or seminars with preliminary notification of the Instructor and submission of the relevant supporting documents. Unless the correct procedure is followed no allowances can be made.

Online course tools and materials: The course will be conducted mainly using the Zoom program, if necessary, additional tools such as Webex, Whatsapp and Skype can be used. In addition, all course materials will be available in the e-course system.

Textbook and readings:

1. Food and Agriculture Organization of the United Nations (FAO). Agroecology for Food Security and Nutrition. September 2014, Rome, Italy.
2. Ecology of Weeds and Invasive Plants. 2007. Radosevich SR, Holt JS, Ghera CM. 3rd edn. Wiley Inter-Science.

3. Food and the Mid-Level Farm: Renewing an Agriculture of the Middle. 2008. Lyson TA, Stevenson GW, Welsh R (eds.) MIT Press.
4. Impact of Genetically-Engineered Crops on Farm Sustainability in the United States. 2010. National Research Council. National Academies Press.
5. Introduction to Agronomy: Food, Crops, and Environment. 2011. Sheaffer C, Moncada KM. 2nd edn. Delmar Cengage Learning.
6. Organic Farming: The Ecological System. 2009. Francis C. (ed.) Agronomy Monograph 54. ASA-CSSA-SSSA.
7. Principles of Ecology in Plant Production. 2010. Sinclair TR, Weiss A. 2nd edn. CAB International.
8. Soil and Water Conservation for Productivity and Environmental Protection. 2004. Troeh FR, Hobbs JA, Donahue RL. 4th edn. Pearson, Prentice Hall.
9. Soil Management: Building a Stable Base for Agriculture. 2011. Hatfield JL, Sauer TJ (eds.) ASA-SSSA.
10. Soil Organic Matter in Sustainable Agriculture. 2004. Magdoff F, Weil RR (eds.) CRC Press.
11. Soil Tillage in Agro-ecosystems. 2003. El Titi A. (ed.) CRC Press.
12. The Conversion to Sustainable Agriculture: Principles, Processes, and Practices. 2010. Gliessman SR, Rosemeyer M (eds.) Advances in Agroecology. CRC Press, Taylor & Francis Group.
13. Toward Sustainable Agricultural Systems in the 21st Century. 2010. National Research Council. National Academies Press.

All are available on the e-course website.

2021 Lecture topics and schedule (tentative):

Sep. Agriculture in Kyrgyzstan: land property right, farm type and productivity, agricultural intensification and factors that drive intensification; obstacles for agricultural development; deforestation: facts, causes & effects; the effects of global climate change on agricultural production system; aspects of technology adoption.

Sep. During the seminar time - visit the water museum, greenhouse, laboratory of water and soil at the Kyrgyz National Agrarian University named after K.I. Skryabin.

Sep-Oct. Agro-ecology and agro-ecosystems: What is agro-ecology? Introduction to an agro-ecological approach to cropping system improvement; agro-ecosystem structure and function – natural ecosystems; evaluating agro-ecosystems over time: productivity, stability (variability), sustainability, and equitability. Soil science: soil erosion and conservation; the reduction of soil fertility; problems of land degradation; struggle measures.

Mid-Oct. Midterm exam

Oct. - Nov. The agro-ecological approach – moving towards sustainability: What is sustainable agriculture? Agro-chemistry: nutrient management, macro and micro elements; mineral fertilizers and organic fertilizers; organic farming; composting; soil-protective and energy-saving treatment system of soil; tillage systems; weed ecology and management.

Nov. During the seminar time - visit to a farmer who has the production of biogas and composting (Partnership with JICA).

Nov. - Dec. Integrated Crop Management: technology of cultivation of grain and cereals crops (Wheat, barley, triticale, oats, corn for grain and silage); technology of cultivation of beans, potato and vegetables; chemical methods to control diseases and pests. Cropping system diversification: crop rotation risks and benefits; the rotation effect; soil quality, and pathogens; cropping system diversification; simple vs. complex rotations – long-term productivity, profitability, and environmental impacts.

Mid-December final exam