

SOCR 421
Crop and Soil Management Systems
Fall 2018

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Office hours: Friday 1:30-2:30pm, or by appointment

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Office hours: by appointment

Course Overview and Objectives:

This course will focus broadly on soil and crop management in agricultural systems, with an emphasis on the driving biophysical factors, processes and interactions. Given that this is a capstone course, emphasis will be placed on integrating concepts and knowledge from previous courses and applying this knowledge toward an interdisciplinary analysis of agroecosystems. We will cover general concepts related to the functioning of agricultural systems around the globe and consider key factors such as resource constraints, ecological sustainability, and socio-economic viability.

The **overall objectives** of this course are to:

- 1) Comprehend the challenges and drivers of agricultural sustainability across an array of crop and soil management systems.
- 2) Understand principles of soil conservation and organic matter management.
- 3) Examine strategies and management implications for efficient water and nutrient use.
- 4) Develop the ability to critically evaluate the sustainability of crop and soil management systems across diverse agroecological contexts.

General Expectations:

You are expected to attend class regularly and be prepared to engage in thoughtful and critical discussion of the material. You are responsible for material covered in lectures/labs, class discussions, and assigned readings. If you miss class it is your responsibility to talk to another student to get notes and find out what you missed.

Everyone is expected to treat one another with courtesy and respect. Recognize that each of us brings a unique perspective to the classroom that can enrich the learning experience of everyone.

Lectures:

Lectures will generally be made available (in PDF format) on Canvas within 24hr of the material being presented.

Readings:

There is no textbook, but readings will be assigned throughout the course. The readings are meant to provide background on the topics to be covered, familiarize students with primary literature, and to encourage participation in the classroom. The readings will be made available on Canvas and should be consulted to prepare for class discussions, assignments and exams. Supplementary reading will also be provided at the end of many lectures and made available on Canvas when possible.

Field Trips:

Several (3-4) field trips are planned for the Wednesday afternoon laboratory sessions (3:00-4:40 pm). These field trips will likely extend beyond the 100 minutes allotted for the lab and students should expect to return to campus late (i.e., after 5:00 pm) on these days. All students are expected to attend the field trips, as they will form the basis for several assignments and laboratory exercises. If you are unable to attend a field trip, please see me beforehand and alternative arrangements will be considered depending on the circumstances.

Laboratory Exercises and Assignments:

Assignments will consist of a mix of reports and problem sets to be conducted individually or in groups (depending on the assignment).

Oral presentations: Each student will also give a 10-12 min presentation (individually or in pairs) during the second half of the semester. Additional detail will be provided in the lab section during the first few weeks of the course.

Quizzes and Exams:

Quizzes will be given in class every few weeks and largely consist of short-answer and multiple-choice questions. The midterms and final will be take-home exams that seek to integrate concepts discussed in the lecture and lab sections, as well as those covered in the assigned readings. Students are expected to **work independently on all quizzes and exams** and are generally given 1 week to complete take-home exams.

Evaluation/Grading:

Assignments and laboratory exercises	250
Oral Presentation	150
Quizzes	200
Midterm Exams	200
Final Exam	150
Participation	50
Total Points	1000

Administrative Notes:

- All assignments and exams have firm due dates and times. Anything turned in after the class period in which it is due will be counted as late and **downgraded 10% per day**.
- Assignments and exams must be turned in as **hard copy**. Please do not send assignments via email, as they will generally not be accepted unless there are special circumstances and get permission beforehand.
- Recognizing that students sometimes have special circumstances, I will consider **extensions** on assignments and exams, within reason, **when they are requested prior to the due date**.
- If you do not already, please be sure to check your CSU **email** regularly, as important announcements will occasionally be communicated via the class email list.
- **Academic dishonesty will not be tolerated!** This includes copying other student's work, plagiarism of any kind, cheating, etc.

Lecture and Lab Schedule:

Below is a **tentative** schedule for the lectures, laboratory and exams. Dates may change and the syllabus will be updated accordingly in Canvas. Changes will be announced in class, but students also need to check the syllabus regularly to stay informed.

Tentative Lecture and Lab Schedule

Wk	Date	Topic	Discussion/Field Trips	Handout Dates Due Dates
1	Aug 20 Aug 22 Aug 24	Course Introduction Agroecosystem Concepts Global Challenges in Ag	Lab/Report Overview	
2	Aug 27 Aug 29 Aug 31	Climate Basics Soils Review Nutrient Cycling Basics	Field Trip 1 - Schwalm Farm (Winsor, CO)	Lab 1 Report
3	Sept 3 Sept 5 Sept 7	No class (Labor Day Holiday) Nutrient Cycling Basics Soil Organic Matter Basics	Discussion - Field Trip 1	
4	Sept 10 Sept 12 Sept 14	Soil Organic Matter Basics Soil Organic Matter Management Nitrogen Cycling	Presentation Overview	Lab 1 Report due Quiz 1 (in class)
5	Sept 17 Sept 19 Sept 21	Nitrogen Cycling Phosphorus Honored Alumni lunch	Field Trip 2 - Golden Prairie (Nunn, CO)	Presentation Sign-up Lab 2 Report
6	Sept 24 Sept 26 Sept 28	Soil Erosion Basics Case Study: Dryland Ag Research Soil Erosion Basics	Discussion - Field Trip 2	
7	Oct 1 Oct 3 Oct 5	Soil Erosion & Conservation Soil Erosion & Conservation Case Study: Conservation Tillage	Field Trip 3 - Native Hill (Laporte, CO)	Lab 2 Report due Quiz 2, Take-Home Exam 1
8	Oct 8 Oct 10 Oct 12	Water Use & Management Water Use & Management Case Study: Deficit Irrigation	Student Presentations	Take-Home Exam 1 due
9	Oct 15 Oct 17 Oct 19	Water Use and Management Intercropping & Diversification Intercropping & Diversification	Field Trip 4 - La Luna Dairy (Wellington, CO)	Lab 3 Exercise
10	Oct 22 Oct 24 Oct 26	Colorado Ag Extension Case Study: Cover Cropping Cover Cropping/Discussion	Comet-Farm Lab	Quiz 3
11	Oct 19 Oct 31 Nov 2	Agroforestry Agroforestry Case Study: Central America	Comet-Farm Lab	Lab 4 Exercise Lab 3 Exercise due
12	Nov 5 Nov 7 Nov 9	Ecosystem Services & Biodiversity Ecosystem Services & Biodiversity Weed Management Issues	Student Presentations	Take-Home Exam 2
13	Nov 12 Nov 14 Nov 16	Soil Health Case Study: Smallholder Ag Africa Research in Agriculture	Student Presentations	Take-Home Exam 2 due Lab 4 Exercise due Quiz 4
14	Nov 19 Nov 21 Nov 23	THANKSGIVING RECESS (No classes)	No lab	
15	Nov 26 Nov 28 Nov 30	Long-term Research in Ag Participatory Research Alternative Ag Systems	Student Presentations	
16	Dec 3 Dec 5 Dec 7	Alternative Ag Systems Global Change Issues in Ag Global Change Issues/Discussion	Student Presentations	Take-Home Final Exam Quiz 5
17	Dec 12	Final Exam, 7:30-9:30 am		Final Exam due