Agronomy 531: Crop Ecology and Management

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Virtual Office Hours: Send me an email if you need to schedule an online/zoom meeting individually or with your group. Key activities in Office Hours include answering unclear content from modules, review of the key module content, or assignment issues/questions.

Overview

The "Crop Ecology and Management" is about learning how farm management integrates ecological principles with technology options in the design and management of cropping practices. In this course, crop production will be examined in the context of management approaches, environmental resources and constraints, and socioeconomic considerations. The ecological principles underlying crop production systems will be emphasized using case studies. Several problem-solving tools will be studied and applied to systematically analyze problems and develop solutions, especially for crops common to the Midwest. With an understanding of various management strategies and crop ecology, you will be better prepared to develop and evaluate crop management recommendations and plans.

Prerequisites: AGRON 501, AGRON 502, AGRON 503. *Recommended: AGRON 512, AGRON 514*.

Objectives

Gain Knowledge

Learning Outcomes: Upon completion of this course, a student will:

• recognize the similarities and differences among crop management approaches.
• explain why are different crops prevalent in different regions.
• employ applications and science underlying ecology of crop production
• distinguish how can management strategies capitalize on ecological processes to optimize productivity.
• discuss some management tools that can be used to improve sustainable production.

Gain Skills

Learning Outcomes: By participating in weekly group discussions (DTs), reading and citing scientific articles and writing professional recommendations, you will be able to:

• lead discussions and provide constructive feedback to peers about crop ecology and management.
• critically evaluate scientific articles and case studies on specific subjects.
• cite scientific literature to support your statements.
• practice writing professional reports and cropping system recommendations.

Course Description

Your ability to use a web browser, input assessment responses via text-editing software such as Microsoft Word and access all of the technologies will directly influence your success in the course. If you have not already done so:

1. Visit the MS Agronomy **website** and look for the section titled "Browser and Computer Compatibility Test: Your Results". Ensure your computer passes all areas of the test. This will ensure your ability to fully utilize the online course materials.
2. Need a refresher on grammar or other writing mechanics? Check out the ISU online [Writing Help Center](#).
3. If you are interested to **create PDF files** for each Module visit [Generate Module PDF: Agronomy Course Tools.](#)
4. You are not required to purchase hard copies of textbooks or reading materials. All books are available to download for free through ISU-Library and Course Reserves. For instructions on "how to download required materials" see 👉 [this](#)page.

Online course material format (asynchronous)

Agron531 consists of 13 modules. Each module starts with an instruction page followed by various subjects, a summary, module reflection, and references at the end. Some modules have short introduction videos to facilitate your learning. Some modules may take longer than others to complete.
Your activities include (see Expectations):
- Checking weekly updates and announcements.
- Subscribing to Community Message Board and published DTs.
- Reading the online module materials and utilizing the included learning tools.
- Submitting lead Discussion Topic posts (DT-LP) and responding thoughtfully to each group DTs**.** Discussions are designed to 1- help you gain perspective on how the concepts in the module might be applied in various situations, 2- support collaboration and communication skills, and 3- improve your professional writing skills. Points are earned through your lead post and active participation in the discussion group (see Study Tips). The class will be divided into 4 groups (4-5 students in each group); for the first half of the semester, you will be assigned to different groups to get to know your peers. For the second half, you will work with the same group members.
- Answering two Reflection questions at the end of each module. Module reflection serves to identify the areas of the module that need improvement and help you think critically. You will answer the same questions every week.
- Answering Exam questions at the end of each module and comprise one or two open text questions or a summary. You have two hours to complete each exam. Summary captures a big picture of the module's content and related questions are designed to evaluate your understanding of the concepts presented in the module and their application to 'real world' agronomic and crop management issues. Access to the current and previous modules is permitted while completing the exam.

- No midterm/final exam. The weekly assessment takes the place of midterm and final exams.
- Completing five Individual Assignments during the semester. The purpose of the assignments is to provide a review of the concepts learned in the modules, use different management tools, and write professional reports and agronomic recommendations.

Required textbooks

Sections of National Research Council (NRC) books:

1- National Research Council (2010), *TOWARD SUSTAINABLE AGRICULTURAL SYSTEMS IN THE 21ST CENTURY*
2- National Research Council (1989), *ALTERNATIVE AGRICULTURE*

NRC books provide an excellent set of case studies of real farms. Some of the 2010 case studies are updated from the same farms in 1989. Other cases are new profiles prepared for the 2010 book. Each is well researched and thorough yet concisely presented. Technologies, regulations, and other facets of agriculture have continued to change since this book was written; some of the practices described are now rather commonplace. We will use these NRC books to illustrate principles and to provide real situations in which we can apply the concepts learned.

Sections of the following books are also used as textbooks in the course

3- Cavigelli et al. (1998) *MICHIGAN FIELD CROP ECOLOGY: MANAGING BIOLOGICAL PROCESSES FOR PRODUCTIVITY AND ENVIRONMENTAL QUALITY*
4- Walthall et al. (2012) *CLIMATE CHANGE AND AGRICULTURE IN THE UNITED STATES: EFFECTS AND ADAPTATION*
   Clark (2007) *MANAGING COVER CROPS PROFITABLY 3rd edition*
5- Madramootoo et al. (1997) *MANAGEMENT OF AGRICULTURAL DRAINAGE WATER QUALITY*
6- Winter et al. (1998) *GROUNDWATER AND SURFACE WATER: A SINGLE RESOURCE*
7- Russell et al. (2018)) *PASTURE MANAGEMENT GUIDE FOR LIVESTOCK PRODUCERS*
8- Nelson (2012) *CONSERVATION OUTCOMES FROM PASTURELAND AND HAYLAND PRACTICES: ASSESSMENT, RECOMMENDATIONS, AND KNOWLEDGE GAPS*

Grading Procedures

Points earned on each assessment (discussion, reflections, assignment, and exam) will be posted in the *Grades* section of Canvas. Your grade will be calculated as the number of points earned out of 950 total points, as categorized in Table 1. I will not scale at the end of the semester.

Table 1

Modules		Module	Pts./Module	Total Pts.

Discussion Topics	Individual lead post (time and content)	18	6	270
	Group interactions		9	
Assignments	Assignment 3	1	80	
	Assignment 4	1	80	
	Assignment 5	1	80	460
	Assignment 8; 3 parts	1	140	
	Assignment 11	1	80	
Module Exam		13	10	130
Module Reflection		13	6	78
Professionalism				12
		Total possible points:		950

Be aware the ISU Graduate College requires you to maintain a cumulative grade point average (GPA) of at least 3.0 (B) on all course work taken, exclusive of creative component credits. For more specific information, please refer to the ISU Graduate Student Handbook.

Table 2

Total Points Earned	Percent	Letter Grade
950	92	A
929	90	A-
898	87	B+
847	82	B
826	80	B-
795	77	C+
743	72	C
723	70	C-
692	67	D+
640	62	D
620	60	D-
<620	Below 60	F

Evaluation criteria for DTs: Discussion contributions will be evaluated on these criteria:

Criteria	Grading Criteria	Possible Points
Timely posting	Lead post is made by Friday midnight (11:59 pm CT).	3
Lead post on the topic	Respond to the discussion topic with an in-depth post related to contents of the module.	2

Evidence-based argumentation	Posts (lead post/ or response to peers) are supported by literature and/or personal experience. Cites all sources of published information used. See Writing Guide	5
Participation as a member of learning community	Demonstrates analysis of others' posts; extends a meaningful discussion by building on previous posts	2
Frequency	Respond to at least 3 lead posts with thoughtful questions, aspects to consider, or a differing viewpoint. Ensure your post promotes critical thinking and further discussion	2
Professional communication and etiquette	Respond to a question about your lead post showing respect to peers.	1
	Total Possible:	**15**

Professionalism: Practice and polish your professionalism. Professionalism includes respectful and courteous interactions with classmates and instructor, your active participation in discussions, clear and logical expression of ideas and thought, and completion of the syllabus acknowledgement and course evaluation. Because quality is an important part of your professional development, apply good writing skills to all of your discussions. Cite your sources! Plagiarizing published information is unethical and will be reported to the Dean of Students.

Policies

Communication: All communication within the course should adhere to university standards of [Netiquette at ISU](). Specifically, communication should be scholarly, respectful, professional, and polite. You are encouraged to disagree with other students, but such disagreements need to be based upon facts and documentation. It is the instructor's goal to promote an atmosphere of mutual respect in our interactions. Please contact me (elnaze@iastate.edu) if you have suggestions for improving the interactions in this course. The class's communication will be:

- **Weekly announcement:** I will send weekly announcements for general updates and changes.
- **Community Message Board:** I will send complementary information related to modules and group activities, procedures, videos, and additional sources. Please make sure you have subscribed. I encourage you to use the "[Community Message Board]()" instead of email if you have general questions related to the course structure, technical issues, assignments, and discussions. Your question might be your peers' question too!
- **Individual questions:** Please use Canvas Inbox to send me emails for individual scientific questions, related to the course materials, unclear content, or assignment issues/questions.
- **Virtual Office Hours:** Send me an email if you need to schedule an online/zoom meeting individually or with your group.

Iowa State University supports and upholds the First Amendment protection of freedom of speech and the principle of [academic freedom]() in order to foster a learning environment where

open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Feedback Policy: All graded assessments will be returned with constructive, personalized feedback within 7-10 days of the due date. I read all your class communications, comments, and discussions on daily basis after 3 p.m. CST. Be sure to check your graded submissions. I will only respond to your Introduction and Reflection. I will post comments on some of the lead DTs particularly if points were deducted! I will not post comments on Module Exams unless points deducted!

Deadlines: All deadlines are posted on the Course Calendar in Canvas. Late assignments will receive a reduction in points received. Any changes to deadlines will be followed up with an Announcement in Canvas. Need extra time to meet a deadline? Explain the situation **IN ADVANCE** and accommodation can be made. Late Submissions without prior arrangement will be assessed for late submissions and will receive a 10% per day penalty, items submitted 4 days late will not be accepted and will be graded as zero.

Academic Integrity Policy: The class will follow ISU's policy on academic dishonesty.
Any suspected academic dishonesty will be reported to the Dean of Students Office. It is your responsibility to understand ISU's policy on academic plagiarism. All Discussions and Exam Questions will be screened for plagiarized content. There are several resources available to help you avoid committing academic misconduct (Academic Dishonesty at ISU: Description; MS Agronomy Program: Writing Guide; Dean of Students Office: Resources for Students)

Steps to Success

Time management is essential for your success in this course! The **Academic Coaching | Academic Success Center** provides in-person coaching and workshops. Do not hesitate to schedule an online appointment to get help with time management. See also some tips for Fall Semester Assignments-Farm Harvest-Family Obligations

Start each module on the date indicated on the calendar. Complete one module each week. Allow about 7 to 8 hours per module (approximately 4 or 5 hours is needed to do the module, plus 1 to 2 hours to participate in discussions). To better understand and retain the information, spread your study time over several days. Work ahead when you know that you will be out-of-town or unable to do a module during its designated period.

o **Do each *In Detail* as you come across its link in the module.** In Detail, items contain the **required** information.
o **Do each *Study Question* and *Try This!* as encountered.** These interactive features are specifically designed to enhance your learning, to provide opportunities to apply the

information presented, and to let you evaluate your understanding of the material. They often expand on the concepts—don't skip these

- o *Discussion Topics.* The discussion forum is an opportunity to interact with your classmates on practical issues related to the weekly module. The topics are an integral part of the course. Your individual 'lead post' (or first post in each DT) and responses to other members of the group are required for full credit.
- o *Module Exam.* Each module is designed to test your knowledge and ability to apply one or more of the concepts from the module to a practical problem or issue. Read the module and explain it to yourself then write a summary using your own words. Post your answer by the due date to receive full credit.
- o **Interact with your classmates and instructor.** Visit the discussion boards often! Discussions need not be limited to assigned topics—use the discussion board to ask questions, share an interesting article or observation, or comment on current and relevant events. If you work ahead, be sure to go back and check the discussion boards (and post your comments and responses to classmates) during that module's scheduled period.
- o **Something unclear?** Please consult with me and your classmates. Questions are welcome anytime.

Writing: In the MS Agronomy Program, we require the ASA-CSSA-SSSA citation style format so you will need to read the instructions explained in the American Society of Agronomy Publications: Handbook & Style Manual and ISU Writing and Media Center: Writing Resource.

Planning: This list of modules and discussion topics is provided to help you plan ahead. Refer to the course calendar for module start dates and due dates, opening and closing dates for discussion topics, exam question due dates, and up-to-date schedule information:

Date		Module	Due dates		
			DT and Exam	Reflection	Asgmts.
Mon	22-Aug	Module 1: Management Approaches			
Fri	26-Aug		DT1-LP		
Sat	27-Aug		M1 Exam	M1 Ref.	
Mon	29-Aug	Module 2: Challenges in Agriculture in an Era of Climat	DT 1		
Fri	2-Sep		DT2-LP		
Sat	3-Sep		M2 Exam	M2 Ref.	
Mon	5-Sep				
Tue	6-Sep	Module 3: Agricultural Ecosystems	DT 2		
Fri	9-Sep		DT3-LP		
Sat	10-Sep		M3 Exam	M3 Ref.	
Mon	12-Sep				
Tue	13-Sep	Module 4: Management Tools	DT 3		Asgmt. 3
Fri	16-Sep		DT4.1-LP		
Mon	19-Sep		DT4.1		
Fri	23-Sep		DT4.2-LP		
Sat	24-Sep		No exam	M4 Ref.	
Mon	26-Sep	Module 5: Indicators and Monitoring Tools	DT4.2		Asgmt. 4
Fri	30-Sep		DT5-LP		
Sat	1-Oct		M5 Exam	M5 Ref.	
Mon	3-Oct	Module 6: Crop Geography and Adaptation	DT 5		Asgmt. 5
Fri	7-Oct		DT6-LP		
Sat	8-Oct		M6 Exam	M6 Ref.	
Mon	10-Oct	Module 7: Crop Function	DT 6		
Fri	14-Oct		DT7-LP		
Sat	15-Oct		M7 Exam	M7 Ref.	
Mon	17-Oct	Module 8: Cropping Systems 1 — Rotations and Sequ	DT 7		
Fri	21-Oct		DT8.1-LP		
Sat	22-Oct		M8 Exam		
Mon	24-Oct		DT 8.1 and DT 8.2-LP		
Thu	27-Oct		DT 8.2 and DT 8.3-LP		
Sat	29-Oct		DT 8.3 and DT 8.4-LP	M8 Ref.	
Mon	31-Oct	Module 9: Cropping Systems 2 — Intercropping	DT 8.4		Asgmt. 8.1.1
Fri	4-Nov		DT9-LP		
Sat	5-Nov		M9 Exam	M9 Ref.	
Mon	7-Nov	Module 10: Water Management	DT 9		
Fri	11-Nov		DT10-LP		
Sat	12-Nov		M10 Exam1		
Mon	14-Nov		DT 10		
Fri	18-Nov	Module 11: Forage management	M10 Exam2	M10 Ref.	Asgmt. 8.1.2
Fri	25-Nov		DT11-LP		
Sat	26-Nov		M11 Exam	M11 Ref.	
Mon	28-Nov	Module 12: Forage Management	DT 11		Asgmt. 11.1
Fri	2-Dec		DT12-LP		
Sat	3-Dec		M12 Exam		
Mon	5-Dec	Module 13: Agriculture and New technologies			
Fri	9-Dec		DT13-LP		
Sat	10-Dec		M13 Exam		
Mon	12-Dec		DT13		Asgmt. 8.1.3
Fri	16-Dec				

Discussion Topic Lead Post: DT-LP

Assignment: Asgmt

Module Reflection: M Ref.

Support

Category	Description	Action
Course Content Support	Questions related to course content or grading should be directed to the course instructor.	[Instructor via Canvas Inbox](#)
Student Support	The Center for Excellence in Learning and Teaching is an organization dedicated to supporting, promoting, and enhancing teaching effectiveness and student learning at ISU. [Self-guided orientation](#) which you may find useful.	[CELT: Online Learner Support](#) [Self-Guided Orientation](#)
Canvas Technical Support	If you experience any technical issues while using Canvas, contact the [Solution Center](#). The Solution Center's hours are posted on their website.	[Solution Center](#)
Technology support	If you have any technical issues while using the University Library's Course Reserves system, please refer to the Library's FAQ page. For all other technical issues, contact [Agron DevLab Support](#). The Agronomy Development Lab staff is guaranteed to respond to requests within 24 hours during regular business hours. All requests made during the weekend will be addressed first thing Monday morning.	[Course Reserves FAQ](#) [Agron DevLab Support](#)
Writing Support	The MS Agronomy program has built a [Writing Guide](#) to help answer some of the questions you may have while working on your courses. Ms. Amy Pollpeter is available for one-on-one consultations and can assist you with any part of the writing process. Schedule an appointment with Amy through the CELT's [website](#) or via [email](#).	[Writing Guide](#) [CELT's website](#) or via [email](#).

Library and research support	Anita Kay is the liaison librarian to the Department of Agronomy. She can help find any article, book or any other piece of information that you want assistance finding. Anita has also built a really useful [Agronomy Research Guide](#).	[Anita Kay Agronomy Research Guide](#)
Department Contact	Contact [Dr. Mary Wiedenhoeft](#), Associate Chair for Academics in Agronomy, if issues persist after working with the support systems listed above.	[Dr. Mary Wiedenhoeft](#)

Instructor

Elanz Ebrahimi is a lecturer in the Agronomy Department at Iowa State University. She teaches in-person and online crop science classes at undergraduate and graduate levels; Systems Analysis in Crop and Soil Management (Agron 392), Crop Growth and Development (Agron 501), and Crop Ecology and Management (Agron 531). She also contributes to research in the area of cropping system modeling and agronomic impacts of long-term biodiverse cropping systems on nitrogen and phosphorus removal.