SYLLABUS: HCS 5412
AGROECOLOGY OF GRASSLANDS AND PRAIRIES
AUTUMN 2019

Course overview

Instructor

Instructor: Dr David Barker

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Office hours: By appointment

Course description

Growth characteristics, adaptation and utilization of grassland species for hay/silage, grazing, fuel and conservation

This course addresses the agroecology of grasslands and prairies, including: i) aspects of the roles of grasses, legumes and forbs in providing forage to livestock (hay or grazing), ii) the application of grasslands to conservation, livestock production and bio-industrial purposes, iii) responses of grasslands to biotics and abiotic factors in their environment, iv) prairie - part of Ohio's botanical heritage, and v) advanced topics related to grassland and prairie management to provide multiple ecosystem services. Multiple ecosystem services might include food production, family/farm income, environmental protection, carbon sequestration, wildlife habitat, water management, and social benefits such as lifestyle and landscape quality.

Course learning outcomes

By the end of this course, students should successfully be able to:

Undergraduate learning objectives

- Obj 1. Develop competence in critical thinking and research, through design, conduct and interpretation of a small greenhouse research project.
- Obj 2. Integrate the fundamentals of physical and biological sciences learned in other classes (e.g chemistry, physics, biology, botany, genetics, molecular biology, evolution, scientific method, etc) to an understanding of grassland and prairie systems.
- Obj 3. Have translational plant science competency, through the application of agronomic principles (e.g. soil science, plant phys., crop/field ecology, landscape design and maintenance, pest management, etc.) to various sustainable forage systems in an efficient, economically sound, environmentally compatible, and socially responsible manner
- Obj 4. Understand the concept of sustainability and relate practices to sustainable grassland management for conservation and production purposes.
- Obj 5. Develop skills in oral, electronic, written, and visual communication at a professional level.
- Obj 6. Understand the fundamentals of successful business and entrepreneurial operation: i.e., planning, goal setting, personnel management, business terminology, finance, economics, etc. as it applies to forage and grassland production systems
- Obj 8. Gain an understanding of a diversity of traditional and non-traditional forage-based production systems.

Graduate program learning goals:

1. Demonstrate scientific competence in the agronomic sciences (Program Learning Goal 1).
2. Appreciate diverse issues within agronomic sciences (Program Learning Goal 2).

Course materials

Required

Forages Volume I. The Science of Grassland Agriculture 7th ed. eds M. Collins, C. J. Nelson, K.J. Moore, R. F. Barnes. Publisher: Iowa State University Press (Blackwell), 2018

Optional materials

Carmen/Canvas, review publications, popular-press articles appearing during the semester.

Grading and faculty response

Grades

Assignment or category	Percentage
Mid-term exam	**15%**
Plant ID	**15%**
Greenhouse project yield	**10%**
Completed project recording sheet	**5%**
Greenhouse project report	**20%**
Final exam	**20%**
Lab Worksheets (7)	**15%**
Total	**100%**

See course schedule, below, for due dates

- Plant ID exam will cover approx 25 forage plants and 25 forage seeds.
- Lab Worksheets will be completed during 7 of the labs. These can be submitted at the completion of the lab, or during the subsequent week, if additional correction or revision is necessary
- Project yield – emulating the dependence of forage producers on attaining a target yield, students can gain up to 10% towards their final grade for achieving a forage yield of 500 g/m^2.
- the Project report will use scientific manuscript format.

Late assignments

Arrangements for late assignments should be made with the instructor. With good reason, assignments can be accepted up to 1 week late without penalty.

Grading scale

93–100: A	87–89.9: B+	77–79.9: C+	67 –69.9: D+
90–92.9: A-	83–86.9: B	73–76.9: C	60 –66.9: D
	80–82.9: B-	70 –72.9: C-	Below 60: E

Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-HELP** at any time if you have a technical problem.)

Grading and feedback

For large weekly assignments, you can generally expect feedback within **7 days**.

E-mail

I will reply to e-mails within **24 hours on school days**.

Discussion board

I will check and reply to messages in the discussion boards every **24 hours on school days**.

Attendance, participation, and discussions

Student participation requirements

The following is a summary of everyone's expected participation:

- **Attendance**: Attendance at class is voluntary, however, not all the curriculum can be found on the website or in the text book; unique material, homework and bonus work will be given in class. Students are required to attend all in-person class meetings. If a student misses class due to an emergency or illness, students should contact me *as soon as possible*.
- **Office hours**: **OPTIONAL** If you are required to discuss an assignment with me, please contact me at the beginning of the week if you need a time outside my scheduled office hours.

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style**: While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. Informality (including an occasional emoticon) is fine for non-academic topics.
- **Tone and civility**: Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably.
- **Citing your sources**: Please cite your sources (For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.).

Other course policies

Academic integrity policy

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an "excuse" for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages (COAM Home)
- *Ten Suggestions for Preserving Academic Integrity (Ten Suggestions)*
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm

Accommodations for accessibility

Requesting accommodations

If you would like to request academic accommodations based on the impact of a disability qualified under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, contact your instructor privately as soon as possible to discuss your specific needs. Discussions are confidential.

In addition to contacting the instructor, please contact the Office for Disability Services at 614-292-3307 or ods@osu.edu to register for services and/or to coordinate any accommodations you might need in your courses at The Ohio State University.

Go to http://ods.osu.edu for more information.

Course schedule (tentative)

Week	Topics, Readings, Assignments, Deadlines
1	Introduction, plant morphology, Spotlight on Species (SOS) = white clover, Greenhouse project
2	Forage yield, forage growth. SOS=ryegrass, plant ID
3	Forage quality, SOS=timothy, Greenhouse project
4	Forages for storage (harvesting), SOS=alfalfa,
5	Forages for grazing systems, seasonality. SOS=orchardgrass, project review
6	Forages for biomass (and other bio-industrial uses), SOS=switchgrass
7	Forages for conservation (incl prairie and savannah), SOS=big bluestem, mid semester exam
8	Root growth and carbon sequestration, SOS=Kentucky bluegrass
9	Plant physiology (role of C4 vs C3 species, alone and in mixtures), temperature, light and water relations, SOS=bermudagrass, harvest in greenhouse
10	Soil fertility (N), SOS=red clover, Project presentations, Forage ID exam.
11	Soil fertility (cations & anions), SOS=annual and biannual legumes,
12	Endophyte, SOS=tall fescue, project review
13	Forage establishment SOS=annual forages/small grains
14	Annual forages and cover crops SOS = sorghum sudangrass, harvest in greenhouse

Meeting Dept. Learning Objectives

1. Be competent in critical thinking and research, i.e., have the ability to effectively gather or generate, analyze, evaluate, and disseminate information. Intermediate; students design, conduct, and interpret a small greenhouse project.
2. Have the ability to integrate the fundamentals of physical and biological sciences (e.g chemistry, physics, biology, botany, genetics, molecular biology, evolution, scientific method, etc.) in sustainable plant systems. Advanced; students will connect information from a number of basic biology courses to understand the complexity of grassland systems
3. Have translational plant science competency, i.e., the ability to apply horticulture, and agronomic principles (e.g. soil science, plant phys., crop/field ecology, landscape design and maintenance, pest management, etc.) to grow and maintain healthy plants in an efficient, economically sound, environmentally compatible, and socially responsible way. Advanced; this course will take a management approach, placing emphasis on those aspects that are responsive to human intervention.
4. Understand the concept of sustainability and be able to use sustainable practices. Advanced; this course will address all aspects of sustainable production within the context of grassland production and conservation
5. Be able to communicate effectively in all aspects (oral, electronic, written, visual, etc.) at a professional level. Intermediate; students have projects requiring written and verbal communication. The final greenhouse project report uses scientific manuscript format.
6. Understand the fundamentals of successful business and entrepreneurial operation: i.e., planning, goal setting, personnel management, business terminology, finance, economics, etc. Intermediate; aspects of the course have immediate application to levels of farm inputs and outputs, with overall implications for profitability.
7. Have an appreciation for and ability to practice life-long learning through self-awareness and evaluation, seeking knowledge, and using evaluation and synthesizing skills. Intermediate; in addition to basic grasslands information, students have a self-directed research project and plant identification exercise that has immediate application outside campus.
8. Have developed an appreciation of and respect for diversity. Beginning; students have exposure to non-traditional methods of food and fuel production, and non-traditional options for land-use.
9. Understand the importance of social responsibility in sustainability and how to be socially responsible. Intermediate; students learn aspects of grassland application that have high social acceptability (grazing, grass-fed production) and low environmental impact (runoff control, erosion reduction, low input use)