

Ecophysiology of Crop Production 2016
AGR 5444 - Graduate Sections
Agronomy Department
University of Florida

Course specifics

Instructor:

Diane Rowland
Agronomy Department
G066 McCarty Hall D
Phone: 352-273-3408
email: dlrowland@ufl.edu

To Contact Instructor:

Students are **encouraged** to contact the instructor. I can be reached by phone (352-273-3408 – office; 229-869-2952 - cell) or email (dlrowland@ufl.edu or via the Canvas site) as needed to clear any doubts about how the course is conducted or about the subject matter (or just to discuss anything of interest or concern). I read email daily and will be happy to conduct general communications via email. Office hours for students on-campus or via Skype or Acano for students off-campus are by request.

Course Description:

Physiological, ecological, and environmental responses that impact growth, development and yield formation of cultivated crops

Course Objective:

To provide students with an understanding and appreciation of the fundamental processes (at the cellular, leaf, whole-plant, and crop canopy levels) that are ultimately integrated to produce crop biomass and grain yield

Credit Hours:

3 hours

Prerequisite:

PLS 3004C (Principles of Plant Science), or equivalent

Class Schedule:

The class meets period 5 (11:45 am - 12:35 pm) on Monday, Wednesday, and Friday in spring semesters. All lectures will be recorded and posted online at the Canvas site for all students in the class. **HOWEVER, IF YOU ARE REGISTERED FOR THE RESIDENT SECTION OF THE CLASS, YOU ARE EXPECTED TO ATTEND CLASS UNLESS YOU NOTIFY THE INSTRUCTOR PRIOR TO YOUR ABSENCE.**

Classroom:

All classes are scheduled for G001 McCarty Hall D for resident students. Online and

resident students will have access to all class materials (including recorded lectures) on the Canvas site assigned to the class.

Class Attendance and Participation:

Attendance is expected for resident students. Online students are expected to view all lectures. **HOWEVER, IF YOU ARE REGISTERED FOR THE RESIDENT SECTION OF THE CLASS, YOU ARE EXPECTED TO ATTEND CLASS UNLESS YOU NOTIFY THE INSTRUCTOR PRIOR TO YOUR ABSENCE.**

Technology Requirements:

Access to and on-going use of a computer is required for all students to successfully complete their UF degree programs. Competency in the basic use of a computer is expected for students in this course. Class participation will require consistent access to the Internet. You are strongly encouraged to have reliable Internet access at home, but the University also has student computer labs available to students who wish to use them. The complete official UF policy on the student computer requirement is found at: <https://wiki.helpdesk.ufl.edu/FAQs/UFComputerRequirements>

Learning Management System (Course Platform) – Canvas:

Learning resources and assignments for this course will be delivered in **E-Learning Canvas**, the centrally-supported course management system at UF. For a tutorial regarding E-Learning Canvas functionality, go to https://lss.at.ufl.edu/help/Main_Page_Canvas

Students enrolled in the course should login to Canvas on the first day of the course at: <http://lss.at.ufl.edu>. You will use your Gatorlink name and password to login to Canvas. If you have any problems, contact the UF IT Help Desk (see contact information below) and/or notify me.

All Powerpoint presentations that support the lectures will be posted within the “Modules” section of Canvas. Note: assignments **FOR GRAD STUDENTS** will be provided in the “Assignments” section of Canvas. Course announcements, general course information and all course communications will also be delivered within Canvas.

UF Computing Help Desk:

The UF Computing Help Desk is available by phone or email at 352-392-HELP (4357) and helpdesk@ufl.edu. The hours of operation are Monday-Thursday: 7:30 am to 10:00 pm; Friday: 7:30 am to 5:00 pm; and weekends 12:00 pm to 6:00 pm.

Texts:

No textbook is required for this course, but the following are some excellent references:

- Boote, K. J., J. M. Bennett, T. R. Sinclair, and G. M. Paulsen (eds.). 1994. *Physiology and Determination of Crop Yield*. American Soc. of Agronomy, Crop Sci. Soc. of America, Soil Sci. Soc. of America. 601 pp.
- Evans, L. T. (ed.). 1975. *Crop Physiology*. Cambridge University Press. 374 pp.
- Fageria, N. K., V. C. Baligar, and R. B. Clark. 2006. *Physiology of Crop Production*. New York: Food

- Products Press. 345 pp.
- Fitter, Alastair H. and Robert K. M. Hay. *Environmental Physiology of Plants* (Third Edition). 2002. Academic Press. 367 pp.
- Gardner, Franklin P., R. Brent Pearce, and Roger L. Mitchell. 1985. *Physiology of Crop Plants*. Iowa State University Press. 327 pp.
- Hay, Robert K. M. and John Porter. 2006. *The Physiology of Crop Yield* (Second Edition). Blackwell Publishing. 314 pp.
- Hay, Robert K. M. and Andrew J. Walker. 1989. *An Introduction to the Physiology of Crop Yield*. Longman Scientific & Technical and John Wiley & Sons. 292 pp.
- Kramer, Paul J. and John S. Boyer. 1995. *Water Relations of Plants and Soils*. Academic Press. 495 pp.
- Lambers, Hans, F. Stuart Chapin III, and Thijs L. Pons. 2008. *Plant Physiological Ecology*. Springer. 604 pp. (available as an e-book through UF Libraries).
- Larcher, Walter. 1995. *Physiological Plant Ecology* (Third Edition). Springer. 2006 pp.
- Pessaraki, Mohammad. 2002. *Handbook of Plant and Crop Physiology* (Second Edition). Marcel Dekker, Inc. 973 pp.
- Prasad, M. N. V. (ed.). 1996. *Plant Ecophysiology*. John Wiley & Sons. 542 pp.
- Sinclair, T. R. and F. P. Gardner. 1998. *Principles of Ecology in Plant Production*. CAB International. 189 pp.
- Sinclair, T. R. and A. Weiss. 2010. *Principles of Ecology in Plant Production*. 2nd Edition. CAB International. 186 pp.
- Smith, D. L. and C. Hamel (eds.). 1999. *Crop Yield Physiology and Processes*. Springer. 504 pp.

HIGHLY RECOMMENDED AND ENCOURAGED – much of the lecture material will be from this textbook and it is available in the UF bookstore:

Taiz, Lincoln and Eduardo Zeiger. 2015. *Plant Physiology* (Sixth Edition). Sinauer Associates, Inc., Publishers. 764 pp.

Assignments and Grades:

- Three exams = 60 points (20 points each)
- Final, comprehensive examination = 24 points
- Paper reviews = 16 points

Eight peer-reviewed journal articles during the semester focused on topics in crop physiology will be assigned and students will be required to write a review summarizing the merits and problems associated with the given study.

- A pre-paper review is provided the week of January 11 to provide you an opportunity to turn in a sample review (not graded) to get instructor feedback on what makes a good review.
- A BONUS paper is provided during the last week of class (April 11) as a make-up for any papers missed during the semester.

These reviews should be in a format and scope similar to one that you would provide a journal when invited to serve as a peer reviewer. *A rubric and example review will be provided to serve as an example of the expectations for these weekly assignments – see Canvas.* No late reviews will be accepted. **Due Dates see Canvas.**

Final course grades will be on a percentage basis:

A = 93-100 C = 73-76

A- =	90-92	C- =	70-72
B+ =	87-89	D+ =	67-69
B =	83-86	D =	63-66
B- =	80-82	D- =	60-62
C+ =	77-79	E =	<60
		I =	Incomplete

Grade point equivalencies for grades are found at:

<https://catalog.ufl.edu/ugrad/current/Pages/home.aspx>

Classroom Etiquette and Demeanor:

Resident students are expected to arrive for class on time (unless arrangements have been made with me) since lectures will begin promptly at the beginning of the period. Cell phones must be silenced during class.

General UF Information

Absences and Make-up Work:

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Academic Honesty, Software Use, Campus Helping Resources, Services for Students with Disabilities:

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to

monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, <http://www.counseling.ufl.edu/cwc/>*

Counseling Services
Groups and Workshops
Outreach and Consultation
Self-Help Library
Training Programs
Community Provider Database

- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Student Complaints On Distance Learning:

Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See <http://distance.ufl.edu/student-complaints> for more details.

Course Topic Outline (also posted in Canvas)

AGR4512 /AGR5444 Crop Physiology				2016		
Date	Day of the Week	Week	Grad student reading	Lecture #	Topic/Event	
1/6/2016	Wednesday	1	NA	1	Class Intro; review of syllabus	Exam 1 start
1/8/2016	Friday	1	NA	2	History of Crop Physiology	
1/11/2016	Monday	2	Sample PAPER	3	Food Production	
1/13/2016	Wednesday	2		4	Radiant energy I	
1/15/2016	Friday	2	FREE	5	Radiant energy II	
1/18/2016	Monday	3	T1: Ozone damage	NA	HOLIDAY	
1/20/2016	Wednesday	3		6	Light Reactions of Photosynthesis	
1/22/2016	Friday	3	T1: DUE	7	Fluorescence	
1/25/2016	Monday	4	T2: RS Fluorescence	8	OJIP	
1/27/2016	Wednesday	4		9	Calvin Cycle/photorespiration	
1/29/2016	Friday	4	T2: DUE	10	C3 vs C4 vs CAM	
2/1/2016	Monday	5	EXAM WEEK	11	Carbon isotopes	Exam 2 start
2/3/2016	Wednesday	5	EXAM WEEK	NA	EXAM 1	
2/5/2016	Friday	5	EXAM WEEK	12	Respiration	
2/8/2016	Monday	6	T3: C3/C4 PSN at glacial CO2	13	Leaf Anatomy and Stomata - single leaf photosynthesis I	
2/10/2016	Wednesday	6		14	Measurements of Photosynthesis	
2/12/2016	Friday	6	T3: DUE	15	Leaf Anatomy and Stomata - single leaf photosynthesis II	
2/15/2016	Monday	7	T4: Isotopes in potato	16	LAI and light interception	
2/17/2016	Wednesday	7		17	LAI and Radiation Use Efficiency	
2/19/2016	Friday	7	T4: DUE	18	Assimilate Transport and Partitioning	Exam 3 start
2/22/2016	Monday	8	EXAM WEEK	19	Harvest Index and determinants of yield	
2/24/2016	Wednesday	8	EXAM WEEK	20	Crop Growth	
2/26/2016	Friday	8	EXAM WEEK	NA	EXAM 2	
2/29/2016	Monday	9	SPRING BREAK	NA	HOLIDAY	
3/2/2016	Wednesday	9	SPRING BREAK	NA	HOLIDAY	
3/4/2016	Friday	9	SPRING BREAK	NA	HOLIDAY	
3/7/2016	Monday	10	T5: QTL for drought in bean	21	Mineral Nutrients	
3/9/2016	Wednesday	10		22	Root system Arch & Func	
3/11/2016	Friday	10	T5: DUE	23	Root system measurements & Root hairs	
3/14/2016	Monday	11	T6: Roots and N & water	24	Root hairs & AMF	
3/16/2016	Wednesday	11		25	Biological nitrogen fixation	
3/18/2016	Friday	11	T6: DUE	26	Water Basics	
3/21/2016	Monday	12	T7: Rhizobia and plant/herb int	27	Water Potential	
3/23/2016	Wednesday	12		28	Hydraulic Redistribution	
3/25/2016	Friday	12	T7: DUE	29	Measuring Crop Water Status	Final Exam start
3/28/2016	Monday	13	EXAM WEEK	30	Stress Physiology	
3/30/2016	Wednesday	13	EXAM WEEK	NA	EXAM 3	
4/1/2016	Friday	13	EXAM WEEK	31	Water Stress Effects	
4/4/2016	Monday	14	T8: Global analysis of turgor	32	More Abiotic & Biotic Stress	
4/6/2016	Wednesday	14		33	ET	
4/8/2016	Friday	14	T8: DUE	34	Irrigation	
4/11/2016	Monday	15	T9: EXTRA	35	Priming	
4/13/2016	Wednesday	15		36	Irrigation Scheduling & WUE	
4/15/2016	Friday	15	T9: DUE EXTRA	37	Remote Sensing	
4/18/2016	Monday	16	NA	38	The Future of Physiology - high throughput phenotyping	
4/20/2016	Wednesday	16	NA	NA	Class Review	
4/27-4/29	Wed-Fri	EXAM	6 am Wed - Noon Fri	NA	Final Exam	