

Description	<p>Mechanisms and hypotheses to explain non-native plant invasions. Impacts of invasions on communities and ecosystems, including natural and agricultural areas, management approaches, and design and analysis of experiments. Offered spring term in alternating years.</p> <p>Biological invasions can suppress native species, alter communities, and change ecosystem processes, and therefore are cited as one of the primary drivers of global environmental change. However, invasive species also provide unique opportunities for testing basic theories in ecology and evolution. In this course we will review the processes and underlying mechanisms of invasions, effects of invasions on communities and ecosystems, and management techniques, with an overall focus on conceptual frameworks, theory, and research approaches.</p>	
Time	Tuesdays 3:00-3:50 (period 8)	
Location	Thursdays 3:00-4:55 (periods 8-9)	
	100% online, synchronous	
	* Class sessions will be online and recorded using Zoom. Access through Canvas.	
Instructor	<p>S. Luke Flory Professor and Associate Chair Agronomy Department University of Florida Gainesville, FL 32611</p>	<p>Office location: McCarty B 3127A * office hours by appointment Mobile: 352-231-2376 flory@ufl.edu</p>
Required text	<p>Lockwood, J.L., M.F. Hoopes, and M.P. Marchetti (2013). <i>Invasion Ecology</i>. Malden, MA: Wiley - Blackwell Publishing, 2nd edition. ISBN-13: 978-1444333657, ISBN-10: 9781444333657</p>	
Reading list	<p>* readings for this course vary depending on the interests and experience of the students but will focus on primary literature in invasion ecology such as:</p> <p>Bradley, B.A., D.M. Blumenthal, et al. (2010). "Predicting plant invasions in an era of global change." <u>Trends in Ecology and Evolution</u>. 25:310-318.</p> <p>Colautti, R.I. and H.J. MacIsaac. (2004). "A neutral terminology to define 'invasive' species." <u>Diversity and Distributions</u>. 10:135-141.</p> <p>Davies, K.W. and R.L. Sheley. (2007). "A conceptual framework for preventing the spatial dispersal of invasive plants." <u>Weed Science</u>. 55:178-184.</p> <p>Diez, J.M., H.L. Buckley, et al. (2009). "Interacting effects of management and environmental variability at multiple scales on invasive species distributions."</p>	

Journal of Applied Ecology. 46:1210-1218.

Funk, J.L. and P.M. Vitousek. (2007). "Resource-use efficiency and plant invasion in low-resource systems." Nature. 446:1079-1081.

Gaskin, J.F. and B.A. Schaal. (2002). "Hybrid *Tamarix* widespread in the U.S. invasion and undetected in native Asian range." Proceedings of the National Academy of Sciences. 99:11256-11259.

Hawkes, C.V., I.F. Wren, et al. (2005). "Plant invasion alters nitrogen cycling by modifying the soil nitrifying community" Ecology Letters 8:976-985.

Leger, E.A. and K.J. Rice. (2003). "Invasive California poppies (*Eschscholzia californica* Cham.) grow larger than native individuals under reduced competition." Ecology Letters. 6:257-264.

Moles, A.T., H. Flores-Moreno, et al. (2012). "Invasions: the trail behind, the path ahead, and a test of a disturbing idea." Journal of Ecology. 100:116-127.

Orrock, J. L., M. S. Witter, et al. (2008). "Apparent competition with an exotic plant reduces native plant establishment." Ecology 89(4): 1168-1174.

Parker, I.M., S. Simberloff, et al. (1999). "Impact: toward a framework for understanding the ecological effects of invaders." Biological Invasions. 1:3-19.

Santos, M.J., L.W. Anderson, and S.L. Ustin. (2011). "Effects of invasive species on plant communities: an example using submersed aquatic plants at the regional scale." Biological Invasions. 13:443-457.

Sax, D.F., J.J. Stachowicz, et al. (2007). "Ecological and Evolutionary insights from species invasions." Trends in Ecology and Evolution. 22:465-471.

Thomsen, M.S., J.D. Olden, et al. (2011). "A broad framework to organize and compare ecological invasion impacts." Environmental Research. 111:899-908.

Course
Objectives

Following this course, students should be able to:

1. Explain the history of invasion ecology.
2. Outline the stages of the invasion process.
3. Describe and critically evaluate hypotheses to explain biological invasions.
4. Summarize the effects of invasions on communities and ecosystems.
5. Describe possible management strategies for invasions
6. Synthesize, critique, and write about primary literature.
7. Lead discussions of peer-reviewed literature.
8. Design experiments to test mechanisms and impacts of invasions.
9. Prepare grant proposals to conduct research on invasive species.

Grades Your grade will be based on two exams, literature discussions, and a grant proposal. Discuss with me ahead of time any anticipated problems with meeting deadlines.

Task	Description	Points	Total
Exams (online)	Exam 1	100	200
	Exam 2	100	
Literature discussions	Lead discussion	30	100
	Participation	70	
Grant proposal (~5 pages)	Questions and outline	20	100
	Draft and peer-review	20	
	Complete proposal	60	
			Class total: 400

Grades will be assigned using the following scale:

94-100 = A; 90-93 = A-; 87-89 B+; 83-86 = B; 80-82 = B-; 77-79 = C+; 73-76 = C; 70-72 = C-; 67-69 = D+; 63-66 = D; 60-62 = D-; < 60 = E.

Assignments

- Exams There will be two exams that cover the general concepts and ideas that we explore in class. The focus will be on understanding hypotheses, mechanisms and theory, not regurgitation of details.
- Discussions We will spend considerable time reading and discussing primary literature. You will be responsible for leading one discussion on one article.
- Proposal Over the course of the semester you will develop a grant proposal focused on a major question in invasion ecology. The development will proceed from formulation of your question, to an outline, to peer review of a rough draft before you submit the complete grant proposal at the end of the semester.

Additional detailed instructions will be provided in class.

Missed Assignments

Please contact me as soon as possible if you do not expect to complete assignments on time so that we can agree on a revised due date or schedule make-up work.

Online Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

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: <http://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.

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/

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, www.counseling.ufl.edu/cwc/*
- *U Matter We Care, www.umatter.ufl.edu/*
- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*

Online 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.