

New Course Fall 2016:

Networks in Agricultural and Ecological Systems

PLP6905 (graduate) / PLP4905 (undergraduate) Section 29AD (Networks Ag Ecol)

2 credit hours

Class meetings: TR Period 5 (11:45-12:35), 2564 Fifield Hall

Prerequisites

Graduate (PLP6905) General knowledge of agricultural or ecological systems, at least two undergraduate or graduate courses applying quantitative concepts and tools

Undergraduate (PLP4905) Junior or Senior standing, general knowledge of agricultural or ecological systems, at least two courses applying quantitative concepts and tools

Instructor: Dr. Karen A. Garrett

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Office: 2411 Fifield Hall

Email: Please use the email system within Canvas during the course (karengarrett@ufl.edu)

Phone: 352-273-9110

Course materials access

TBA

Office hours

By appointment at least 48 hours in advance, 2-4 Tuesday and Wednesday, or additional times as needed

Course overview

This course provides an overview of networks and network models in agricultural and ecological systems. Network models provide useful perspectives on any system with groups of entities whose individual interactions are of interest: epidemic spread among farms or people, microbiome interactions, food webs, social networks, seed networks, transportation of agricultural products, the spread of innovations, etc. Concepts and tools for evaluating networks are related across all these types of systems.

The course includes a combination of lectures to provide background information, discussion of current literature, computational analysis workshops to illustrate concepts, and projects to allow participants to apply ideas to systems that particularly interest them.

The course emphasizes concepts and use of existing tools, while at the same time it will offer a basis for the development of new tools for participants interested in further steps.

Course learning objectives

Participants who have completed this course will be able to...

- ❖ explain how networks are defined and applied in agriculture and ecology
- ❖ broadly understand and discuss journal articles describing networks in these systems
- ❖ evaluate dynamic networks and study processes in networks
- ❖ collect data for characterizing networks and testing the fit of network models
- ❖ apply network models to ask questions about their own systems using R

Course outline (as of August 8, 2016 – subject to change)

	Tues: generally a short lecture and discussion of a paper	Thurs: generally a short lecture and a workshop for applications in R
Aug 23,25	Introduction to course and to networks	Intro to R
Aug 30, Sep 1	Networks and adjacency matrices	Matrices in R
Sep 6, 8	Epidemic networks	Networks in R
Sep 13, 15	Network motifs	Simulating network structures
Sep 20, 22	Agent-based modeling	Agent-based model examples
Sep 27, 29	Innovation networks	<i>Microbiome networks</i>
Oct 4, 6	<i>Decision-making networks</i>	<i>Genes in networks</i>
Oct 11, 13	Social networks	Evaluating social networks
Oct 18, 20	Project proposal presentations	Project proposal presentations
Oct 25, 27	Exponential random graph models	Fitting statistical models to networks
Nov 1, 3	<i>Transport networks</i>	<i>Stored grain network example</i>
Nov 8, 10	Scaling development impacts	Seed system example
Nov 15, 17	Network optimization	Network optimization example analysis
Nov 22, 24	Complex adaptive systems	<i>Thanksgiving vacation</i>
Nov 29, Dec 1	Topic: participant choice	Final project presentations
Dec 6	Final project presentations	

The written project proposals will be due Oct 21, and written final projects will be due Dec 7. Every day late will result in 10% reduction in the grade for that assignment.

Grading

Undergraduates

20% Class discussions

20% Weekly quizzes
25% Project proposal
35% Final project

Graduates

20% Class discussions
20% Weekly quizzes
20% Project proposal
10% Journal article presentation and discussion
30% Final project

Brief quizzes are given most weeks, to help participants keep up with the course material. The lowest three quiz scores will be dropped from the grade, so there is no option to make up quizzes.

The project proposal will give students an opportunity to show how they can apply the course concepts and tools to an area of particular interest to them.

Each participant signed up for graduate credit will lead a journal article discussion for the group.

Final projects will be presented and discussed in the class. The final project will be more extensive for graduate credit.

If the grade on an assignment appears incorrect, the process for requesting reconsideration of the grade is to prepare a written statement describing where the error lies, to be turned into the instructor within one week of receiving the grade.

Grades and Grade Points: For information on current UF policies for assigning grade points, see <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Grading scale: 94-100 A; 90-93 A-; 87-89 B+; 84-86 B; 80-83 B-; 77-79 C+; 74-76 C; 70-73 C-; 67-69 D+; 64-66 D; 60-63 D-

Required course materials

There is no required textbook for this course. Journal articles for discussion will be provided to the class. The journal articles will be chosen in discussion with the participants who will be leading discussions, to represent the general topics in the schedule above.

Participants might be interested in the following book for reference, which provides much more information about general network applications than will be covered in this course. Newman, M. 2010. Networks: An Introduction. Oxford University Press.

Garrett teaching philosophy

I think of teaching as a process that occurs in a network (of course). An individual could create a pretty good learning experience by finding a good set of books and papers on a topic, and trying out some R code on their own. However, this course is designed to offer a fuller experience and more efficient learning by linking participants to key literature, to relevant R packages, and to each other and the instructor through discussions and feedback. Engaging with a group of people interested in a topic can also be a lot of fun and boost creativity.

The course is designed to support participants in engaging with projects, rather than emphasizing testing. The quizzes are intended to provide some structure to help keep people up to date and engaged in the discussions. Most of the course activities will engage knowledge and creativity in developing projects. I will work to help each student develop a project that they will find useful in their current or future research.

Attendance and make-up policies

This is a synchronous course, to make the most of interactions among participants. Discussion among course participants is an important part of the learning experience, so attendance is required. Three course meetings can be missed without explanation (with the exception of dates when the participant has a particular responsibility, such as leading discussions or presenting). Please alert the instructor if there is a serious health problem or other emergency.

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>.

Accommodations 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 should first register with the Disability Resource Center at 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/ and provide appropriate documentation.

On-line course evaluation

For this course, we will also ask students to anonymously provide some more specific recommendations for making the course as useful and interesting as possible, in both a mid-term survey and a final survey. This will be in addition to the general UF course assessment.

UF Policy: Student assessment of instruction is an important part of efforts to improve teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for

students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Materials and supplies fees

None

UF Policy on 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>.

UF Policy on 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

The university’s counseling resources are available for students experiencing personal problems that interfere with their general well-being and/or academic performance. The Counseling & Wellness Center provides confidential counseling services at no cost for students that are currently enrolled with the university.

- University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, 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, 352-392-1601, www.crc.ufl.edu/

Student complaints

If there is an issue in the course, please bring it to the instructor's attention. UF policies about more serious complaints are described in these documents.

- Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
- Online Course: <http://www.distance.ufl.edu/student-complaint-process>