

FOR6154 *Analysis of Forest Ecosystems*

3 CREDITS – FALL TERM

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COURSE DESCRIPTION: Concepts of the forest ecosystem, the role of models for understanding ecosystem dynamics, disturbance regimes and stability theory, nutrient cycles, and ecosystem energetics.

COURSE GOALS AND/OR OBJECTIVES: This course is designed to provide an introduction to the ecosystem concept and methods of ecosystem analysis that are relevant to ecological restoration. Students completing the course will be able to:

- Summarize and explain key concepts concerning ecosystem dynamics and applications of ecosystem theories.
- Explain dynamic ecosystem models, understand how model outputs depend on parameters, and discuss possible applications of simulation models for management.
- Critically evaluate scientific literature using ecosystem approaches.

PREREQUISITES: BSC2010, or equivalent at the discretion of the instructor

COURSE WEBSITE: <https://fss.at.ufl.edu/>

REQUIRED TEXT: No required text. Readings will include a variety of scientific and technical papers, likely including but not limited to:

Beckage, B., W.J. Platt and L.J. Gross. 2009. Vegetation, fire, and feedbacks: A disturbance-mediated model of savannas. The American Naturalist 174(6)

Harwell, M.A., W.P. Cropper, Jr. and H.L. Ragsdale. 1977. Nutrient recycling and stability: A reevaluation. Ecology 58:660-666.

Pickett, S.T.A. and M.L. Cadenasso. 2002. The ecosystem concept as a multidimensional concept: Meaning, model, and metaphor. Ecosystems 5:1-10.

Truill, L.W., B.W. Brook, R.R. Frankham and C.J.A. Bradshaw. 2010. Pragmatic population viability targets in a rapidly changing world. Biological Conservation 143:28-34.

Pool, R. 1989. Ecologists flirt with chaos. Science 243:310-313.

Peck, S.L. 2004. Simulation as experiment: a philosophical reassessment for biological modeling. Trends in Ecology and Evolution 19:530-534.

Loudermilk, E.L., W.P. Cropper, Jr., R.J. Mitchell and H. Lee. 2011. Longleaf pine and hardwood dynamics in a fire-maintained ecosystem: A simulation approach. Ecological Modelling 222:2733-2750.

Huston, M.A. and D.L. DeAngelis. 1994. Competition and coexistence: The effects of resource transport and supply rates. American Naturalist 144:954-977.

Garcia-Montiel et al. 2001. Controls on soil nitrogen oxide emissions from forest and pastures in the Brazilian Amazon. Global Biogeochemical Cycles 15:1021-1030.

Flannigan et al. 2009. Implications of changing climate for global wildland fire. International Journal of Wildland fire 18:483-507.

Papaik et al. 2010. Forest processes from stands to landscapes: Exploring model forecast uncertainties using cross-scale model comparison. Canadian Journal of Forest Research 40:2345-2359.

Finzi et al. 2011. Responses and feedbacks of coupled biogeochemical cycles to climate change: Examples from terrestrial ecosystems. Frontiers of Ecology and Environment 9:61-67.

Powell, T.L. et al. 2008. Carbon exchange of a mature, naturally regenerated pine forest in north Florida. Global Change Biology 14:2523-2538.

ADDITIONAL RESOURCES: Narrated power point modules with web links, and readings for each module, can be found at <https://lss.at.ufl.edu/>. Download the free Wolfram CDF player at <http://www.wolfram.com/cdf/>.

COURSE POLICIES

Participation is critical for this course. Two important ways that you will participate involve **discussion threads** and **model wikis**. When a discussion thread is scheduled you should be prepared to summarize the main points of the paper(s) add commentary, and raise additional questions. A general discussion thread will always be open for other matters related to the power points or papers. There are a series of web based modeling exercises with specific questions from the power points. You should address those questions in the model wikis.

The major project of this course will be a **written paper that deals with a theoretical or applied aspect of ecosystem science related to forests**. The topic of your paper must be approved by the end of week 3. The literature review of your topic (usually incorporated in the final paper) will be due by the end of week 7. 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>.

Any requests for make-ups due to technical issues **MUST** be accompanied by the ticket number received from LSS when the problem was reported to them. The ticket number will document the time and date of the problem. You **MUST** e-mail your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Late work will be penalized 5 points per day.

| Assignment | Points |
|---------------------------------------|-------------------|
| Paper Discussions | 4 @ 5 points - 20 |
| Model Wikis | 4 @ 5 points - 20 |
| Literature Review (on approved topic) | 20 |
| Paper (on approved topic) | 40 |

Letter grades will be assigned as follows:

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|----|---------------------|
| A | 93-100 points |
| A- | 90-92 points |
| B+ | 86-89 points |
| B | 83-85 points |
| B- | 80-82 points |
| C+ | 76-79 points |
| C | 73-75 points |
| C- | 70-72 points |
| D+ | 66-69 points |
| D | 63-65 points |
| D- | 60-62 points |
| E | less than 60 points |

For information on current UF policies for assigning grade points, see

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

COURSE SCHEDULE:

| Week | Topic | Reading | Assignment |
|------|----------------------|----------------------------|---------------|
| 1 | Ecosystem Concept | Pickett and Cadenasso 2002 | Discuss paper |
| 2 | Philosophy of Models | Peck 2004 | |

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|----|---------------------------------|--|--|
| 3 | Simulation | Loudermilk et al. 2011 | Get approval for paper topic Model Wiki |
| 4 | Stability Concepts | Traill et al. 2010 | |
| 5 | Stability Concepts | Harwell et al. 1977 | Model Wiki |
| 6 | Alternate Stable States | Beckage et al. 2009 | Discuss paper |
| 7 | Chaotic Dynamics | Pool 1989 | Literature Review Model Wiki |
| 8 | Disturbance Regimes | Papaik et al. 2010 | |
| 9 | Nutrient Cycling | Garcia-Montiel et al. 2001 | Discuss paper |
| 10 | Nutrients and Competition | Huston and DeAngelis 1994 | Model Wiki |
| 11 | Trophic dynamics and Energetics | Pace et al. 1999 Teskey et al. 1994 | |
| 12 | Eddy Flux | Powell et al. 2008 | Discuss paper |
| 13 | Global Ecology | Finzi et al. 2011 | |
| 14 | Ecosystem Research Networks | LTER Brochure Neon Breaks Ground Neon Strategy | Final paper due |

Disclaimer: This syllabus represents my current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

Online Course Evaluation Process

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>.

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/*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library

Wellness Coaching

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