

## ***SWS 6932 - Modeling Land Biogeochemistry*** **Section #0048**

<b><i>Term</i></b>	Spring 2017
<b><i>Meeting Time</i></b>	Tuesday Period 4-5 (10:40am – 12:35pm); MCCB 3086 (Computer Lab) Thursday Period 4 (10:40am – 11:30 pm); MCCB 3086 (Computer Lab)
<b><i>Instructor</i></b>	Stefan Gerber 3179 McCarty Hall Phone: 352-294-3174 <a href="mailto:sgerber@ufl.edu">sgerber@ufl.edu</a>
<b><i>Office hours</i></b>	Thursday 12:30pm to 2:30 pm or by appointment

***Course Prerequisite:*** A minimal proficiency of calculus (e.g. MAC 2233: Survey of Calculus 1; PHY 2048 Physics with Calculus 1, or similar), as well as some programming experience in a basic computer language such as C or FORTRAN (e.g. COP3272: Programming using C) is advantageous but not a requirement.

### ***Course Description***

Dynamic land models are widely used as part of Earth system models and serve to represent exchange of energy (heat radiation momentum), water, carbon, and nutrients between land and the atmosphere ocean system. We will investigate how biological processes are formulated mathematically to capture the broad range of plant functioning on a regional to global scale. We will particularly address how such processes are represented and resolved in a model code. We will then make use of a land surface model to explore effects global environmental change on vegetation and land surface dynamics.

### ***Objectives***

By the end of this course, students will be able to

- Describe processes represented in a dynamic global land model
- Apply and evaluate global land models for global change and biogeochemistry research
- Describe linkages between land carbon cycles, water cycles, and climate
- Assess restrictions and limitations of mechanistic land surface model.

### ***Course Format***

3 credit course where contact hours are divided into a two hour and one hour period per week. The weight of lecture, computer lab and discussion shifts during the semester with focus on lectures initially, and moving towards labs and discussion with the progression of the semester.

### ***Course text:***

Reading assignments will be available on the course website <https://lss.at.ufl.edu/> in form of scientific papers. Optional, further reading include the following titles

- Bonan G, Ecological Climatology, 2002, Cambridge University Press

- Climate Change 2013 - The Physical Science Basis Contribution of Working Group I to the Fifth Assessment Report of the IPCC (available online [www.ipcc.ch](http://www.ipcc.ch))
- Jacobson M.C. et al., 2000, Earth System Science from Biogeochemical Cycles to Global Change

**Course Parts**

*Introduction into mathematical representation of processes*

- Plant photosynthesis
- Soil water dynamics
- Plant carbon allocation
- Mortality and fire
- Decomposition
- Vegetation Dynamics

*Modeling land surface processes*

- Introduction in modeling structures and concepts
- Numerical representation of land surface processes
- Application of a dynamic global land model

*Project: Application of a global dynamic land model to investigate land surface dynamics*

- Project development execution and analysis in consultation with instructor
- Discussion of individual/group projects in class

**Grading System**

Grading consists of individual assignments, group work and an individual final project. Throughout the semester, students will work on individual modeling lab assignments. Additional graded assignments are group projects, where students will explore model features. Important: Grading will *not* focus on specific model outcome but the student’s work will be evaluated based on critical examination of model formulation, and discussion of model behavior and results. Therefore, active participation and willingness to experiment is a must. **Assignments turned in late results in a loss of half of the maximum points, unless late turn-in is caused by excused absences.**

Letter Grade	Grade Points
A	95-100
A-	90-94
B+	85-89
B	80-84
B-	75-79
C+	70-74
C	65-69
C-	60-64
D+	55-59
D	50-54
D-	45-49
E	<45

Course	Weight
Individual Assignments	35 %
Modeling League Assignments	35 %
Final Project/Report	15 %
Final Oral Presentation	15 %

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

**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>.

**Class Attendance:** Not necessary, but omitting substantial portions of the class will hamper the student's ability to complete the required assignments in a satisfactory manner and will affect the grade.

**Class Demeanor and Etiquette:** Students are expected to be considerate and respectful towards fellow students, teaching assistants, instructors, and guest lecturers. This includes a behavior that is not disruptive to class such as punctual attendance, the silencing of cell phones and similar electronic devices, and avoiding private conversations.

**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>. All students are required to abide by the Academic Honesty Guidelines which have been accepted by the University (<http://www.dso.ufl.edu/studentguide/studentrights.php>)

**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

Wellness Coaching

U Matter We Care, <http://www.umatter.ufl.edu>

Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)

### **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/](http://www.dso.ufl.edu/drc/)

### **University of Florida Complaints Policy**

The University of Florida believes strongly in the ability of students to express concerns regarding their experiences at the University. The University encourages its students who wish to file a written complaint to submit that complaint directly to the department that manages that policy.

A student who is unsure as to the official responsible for handling his or her particular complaint may contact the Ombuds office or the Dean of Students Office. For complaints that are not satisfactorily resolved at the department level or which seem to be broader than one department, students are encouraged to submit those complaints to one of the following locations:

Ombuds: <http://www.ombuds.ufl.edu/>

31 Tigert Hall, 352-392-1308

The purpose of the Ombuds office is to assist students in resolving problems and conflicts that arise in the course of interacting with the University of Florida. By considering problems in an unbiased way, the Ombuds works to achieve a fair resolution and works to protect the rights of all parties involved.

Dean of Students Office: <http://www.dso.ufl.edu/>  
202 Peabody Hall, 352-392-1261

The Dean of Students Office works with students, faculty, and families to address a broad range of complaints either through directly assisting the student involved to resolve the issue, working with the student to contact the appropriate personnel, or referring the student to resources or offices that can directly address the issue. Follow up is provided to the student until the situation is resolved. Additionally, the University of Florida regulations provide a procedure for filing a formal grievance in Regulation 4.012: <http://regulations.ufl.edu/regulations/uf-4-student-affairs>