Global Agroecosystems

ALS 5155 (This course is also taught at the undergraduate level as ALS 4154)

INSTRUCTORS:
Dr. Diane Rowland, Professor, University of Florida, Institute of Food and Agricultural Sciences, Agronomy Department, 3105 McCarty Hall-B, P.O. Box 110-500, Gainesville, FL 32611-0500; dlrowland@ufl.edu

Dr. George Hochmuth, Professor, University of Florida, Institute of Food and Agricultural Sciences, Soil and Water Science Department, G175 McCarty Hall-A, P.O. Box 110290, Gainesville, FL 32611-0290; hoch@ufl.edu

Dr. Wes Wood, Professor, University of Florida, Institute of Food and Agricultural Sciences, Soil and Water Science Department

CONTACT:
Dr. Diane Rowland
Office Location: G062 McCarty Hall-D
E-Mail: dlrowland@ufl.edu
Phone: 229-869-2952
Fax: 352-392-1840

COURSE OFFERED: Every Fall Semester, resident and distance education

TIMES: Weekly lectures will be viewed from the Sakai course management site; once a week meeting via videoconference – TBD.

CREDIT HOURS: 3

OFFICE HOURS: By appointment

PREREQUISITES
Introduction to Soils (SWS 3022), Soils for Environmental Professionals (SWS 5050), Applied Field Crop Production (AGR 4214C), and Agricultural Ecology (ALS 3153), or equivalents, or approval by the instructors.

COURSE DESCRIPTION:
This course focuses on the principles of agroecology and presentation of topics that integrate ecological with agricultural principles to optimize resource conservation, productivity, societal benefit, and profitability.

COURSE OVERVIEW:
There is a need for students trained broadly in agriculture, including agriculture’s role in ecology as farming systems become more complex. This context is found in the “triple bottom line” of economics, environment, and society. This course will emphasize greater understanding of this triple bottom line in agricultural production in an ecosystem context, often termed agroecology. It will focus on the global trends of increasing population and
land-use pressure; diminishing soil, water, nutrient, and energy resources; concern over
the negative impacts of agricultural production on the environment; and increasing
awareness of the potential ecosystem service benefits from agriculture.

COURSE OBJECTIVES:
The overall objectives of the course are to provide students with: 1) understanding of the
complex interactions that occur in agroecosystems; and 2) the ability to apply this
knowledge to the design and management of sustainable agricultural production systems
across the world.

STUDENT LEARNING OBJECTIVES:
Following this course, students are expected to be able to:
1. Describe and understand global agricultural production systems and their role in
   facing the challenge of increasing global population.
2. Evaluate and discuss agricultural production issues from environmental, economic,
   and societal perspectives.
3. Analyze research literature dealing with the sustainability of agriculture.
4. Synthesize and apply the knowledge gained in this course to assess emerging
   agricultural production systems.
5. Use principles learned in this course to synthesize and evaluate a relevant and timely
   global issue in agroecology and effectively communicate in video format.

CLASS FORMAT
Three 50-minute pre-recorded video lectures per week that will be placed in the Lessons
tab on the course Sakai site. There will be a weekly one hour class meeting to discuss
reading and discussion assignments via videoconference.

TEXTBOOK
None required. Readings will be assigned for each week of the course. The following
textbooks are useful references for the course:

   ecology, economics, and society. CRC Press, Boca Raton, FL.
Scherr, S.J., and J.A. McNeely (eds.). 2007. Farming with Nature: The Science and
   Practice of Ecoagriculture. Island Press, Washington, DC.
Vandermeer, J.H. 2010. The ecology of agroecosystems. Jones & Bartlet Learning,
   Sudbury, MA.
   Press, Binghamton, NY.
ASSIGNED READINGS
To be posted in Sakai or emailed each week.

SPECIAL SOFTWARE
None required

E-LEARNING
E-learning Sakai. The entire course will be managed through e-learning using Sakai. This is a fully on-line course delivered in E-Learning Sakai, the centrally-supported course management system at UF. Sakai is the on-line source for the majority of your learning resources and assignments in this course. For a tutorial regarding E-Learning Sakai functionality, go to https://lss.at.ufl.edu/sakai-training/student_index.shtml. Students enrolled in the course should login to Sakai on the first day of the course at: http://lss.at.ufl.edu. You will use your Gatorlink name and password to login to Sakai. All PowerPoint presentations that support the video lectures will be posted within the “Lessons” section of Sakai, as well as readings on the lecture topics.

Should you have any complaints with your experience in this course please visit http://www.distance.ufl.edu/student-complaints to submit a complaint.

EVALUATION OF STUDENTS
The class is graded on the point scale, totaling 125 points. Class participation comprises 30 points towards the final grade and will consist of weekly discussions of assigned scientific readings on advanced topics and a one-page, double-spaced review of an individually assigned question pertaining to the reading. Students will be expected to submit their review prior to the weekly discussion time and review their answer with the group during the weekly videoconference. There will be two exams and a final exam, each accounting for 25 points. On exams, graduate students will answer in-depth discussion questions beyond those expected of the undergraduate students. All students will complete exams online through Sakai. For an additional 20 points, graduate students will complete an IFAS EDIS-type fact sheet (http://edis.ifas.ufl.edu/) involving identification of a current issue in agroecology, review of the pertinent research, description of innovative strategies for its mitigation, and identification of gaps in the science. In addition to the fact sheet, students will prepare a powerpoint of their topic for posting on the Sakai site. Students will use their powerpoint to make a presentation about their topic using Voice Thread.

Make-up exams will be approved only due to illness or extreme family needs, or important excused activities required by another class. Make-up exams must be approved prior to the regularly scheduled exam, and must be made-up within two class periods. If you are unable to take the exam due to illness, contact the instructor prior to the exam to confirm your absence.

GRADING:
We will use the following grading for the course:

- A 94 – 100%
- A- 90 – 93%
Grades and Grade Points Effective May 11, 2009 - Summer A

http://registrar.ufl.edu/catalog/policies/regulationgrades.html

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B-</th>
<th>C+</th>
<th>C-</th>
<th>D+</th>
<th>D-</th>
<th>E</th>
<th>WF</th>
<th>I</th>
<th>NG</th>
<th>S-U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Points</td>
<td>4.0</td>
<td>3.67</td>
<td>3.33</td>
<td>3.0</td>
<td>2.67</td>
<td>2.33</td>
<td>2.0</td>
<td>1.67</td>
<td>1.33</td>
<td>1.0</td>
<td>.67</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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

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

CLASS PARTICIPATION AND ATTENDANCE
We expect that all students will participate in the class by actively engaging in weekly videoconference discussions which will comprise 30 points of the final course grade.

STUDENT RESPONSIBILITIES AND EXPECTATIONS:
It will be expected that students will take leadership in discussions providing guidance and insight to other students.

Readings will be assigned that will supplement class lecture and discussion material. Students are expected to read the materials. Discussions and some exam questions will come from the reading material. We expect a higher level of synthesis and evaluation of these materials beyond just description. This will involve the application of principles within the literature to local/national/global issues.

Specific expectations are outlined in the Evaluation of Students section of the syllabus.

TOPICAL OUTLINE

<table>
<thead>
<tr>
<th>Week in semester</th>
<th>Topic</th>
</tr>
</thead>
</table>
| 1                | Course introduction and student expectations. Agroecology defined; what is an “agroecosystem”? How have demands on the world’s farms changed? Ancient civilizations and the theory of “overshoot and
| 2 | The major crops that feed the world; global crop distribution; major U.S. crop imports and exports |
| 3 | The challenge of feeding an increasing global population; declining rates of yield increases; ecological impacts, biological limits to crop production; variety development and other technologies that allow us to produce more with less |
| 4 | The impact of soil on ecosystem productivity; loss of arable land to urbanization; recent advances in soil, water, and nutrient conservation; the interaction of agriculture and natural ecosystems |
| 5 | Global water crisis: the water wars are here! Global water budget; history of water rights; paying farmers not to irrigate (GA/FL/AL); Texas groundwater and the rule of capture; quantifying crop water use for policymakers; Ogallala crisis; to irrigate or not to irrigate? defining drought tolerance and water productivity; technologies for reducing irrigation rates |
| 6 | Water quality; history of environmental regulations; why water quality matters to crops; environmental issues related to water quality; N, P, pesticides and the major pollutants; Best Management Practices |
| 7 | Nutrient use efficiency in major world food crops; global nutrient budgets at various scales; peak phosphorus |
| 8 | Physiology of weed herbicide resistance: genes to whole plant; the evolution of superweeds; how crops fight back |
| 9 | Physiology of disease tolerance/resistance; abiotic/biotic stress tolerance in crop; impacts of climate change on exacerbation of stress |

During the following weeks students will be expected to read and discuss current scientific literature related to each of the topics below.

| 10 | **Putting it all together: Using research to analyze, evaluate, and contrast cropping systems** |
|    | **Industrialized farming**: the need for big ag in meeting the food challenge in 2050; changing the face of rural America; the role of small farms in food production |
|    | **The morphing face of organics**: the original idea and philosophy; the heavy hand of regulation; the benefits and problems; the assumptions; the niches; food quality differences and the effects of post-harvest handling; environmental impact (assumed and
<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
</table>
| 11   | Putting it all together: Using research to analyze, evaluate, and contrast cropping systems  
**Building a new beast:** hybrid systems using low input and intensive techniques together; picking and choosing suitable techniques; animal/crop integrated systems; sod-based rotation with grazing  
**The war between locavores and globavores:** the balance sheet of costs |
| 12   | Can the food production system meet the challenges?  
**Food safety:** sources of contamination on and off the farm  
**Food security:** globalization of our food sources; invasives (plants, diseases, insects) |
| 13   | Can the food production system meet the challenges?  
**Energy for farms:** on-farm fuel production; energy costs of different agricultural systems; the debate between growing food and fuel on global hunger |
| 14   | Economics and society  
**Relevance of the triple bottom line:** economics, environment, and society; increasing costs of inputs; global competition in food production and food demand |
| 15   | Synthesizing and reflecting on the principles of agroecology  
**Research and science:** what role does science play? What are the costs and who’s going to pay for the research? the direction of sustainable intensification |
| 16   | Communicating the principles of agroecology  
**Communication:** communicating science to the public; why can’t scientists talk about science; support of agricultural science and why it’s important |

**CLASSROOM ETIQUETTE AND DEMEANOR:**  
Students are expected to arrive for class on time since lectures will begin promptly at the beginning of the period. Cell phones must be turned off during class.
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: http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.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, 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.