

**EVR 5705 Natural Resource Management and Innovation Systems (NRMIS)**  
Spring 2020 Mondays, 1:55pm to 4:55pm at Turlington 2342

**Instructor information:**

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Phelps Lab, office Hours by appointment

*"Theory without practice is gratuitous; practice without theory, aimless." (Anonymous, 1972)*

**Course Description:** Natural-resource science, technology, and the innovation process. Focus on subjects related to food, agriculture, forestry, water, the urban environment, and energy, and how they impact sustainable development.

**Course Framing:** This course addresses how human societies perceive, use, and change natural resources, by examining the drivers, feedbacks, and social impacts of the innovation process. The course connects the ecological and economic systems studied during the first semester of the Master's in Development Practice degree program with the social realm. Whereas innovation systems have traditionally taken the perspective of a market economy and how firms rely on and influence innovation, this course focuses on the materials and energy on which societies depend, the ecological- economic-social dynamics of change in materials/energy use, and the ways science, technology and society integrate to foster sustainable development. This course recognizes that industrial civilization relies upon natural resources for its support, development, and growth.

The course will analyze which kinds of technologies can be called sustainable and which criteria we should employ to define them as such. It will also adopt the view that innovation does not only encompass the biophysical world, but that it can extend to the sphere of social institutions and organizations, which may have to change in order to make the search for and adoption of sustainable practices possible.

**Course objectives:**

- Identify and discuss the unresolved dilemmas in the fields of science, technology and innovation, with particular attention to the gaps in our understanding of their inter-connections and impacts upon social well-being.
- Conduct a critical survey of how the innovation process works: its drivers, its impacts, its feedbacks, with particular emphasis upon cases in agriculture, forestry, water management and energy alternatives.
- Address specific innovation cases from a sustainability perspective: new products, new processes and their impacts upon the scientific realm and social processes.
- Develop an understanding of the role that technology and innovation play in present-day concerns about the environment and sustainability.

Format

An initial reading list will be provided in digital form. During each class session individual students will present a summary and lead a discussion of the selected papers. Students will also add to the course content from the literature they are employing, case studies from their own background or experience, and group projects. An interactive mode of discussion will be pursued, through which particular points of interest, conflict, or suggestions for research will be addressed in a collective manner. To allow for ample discussion, we will meet for three consecutive periods, once a week (or two periods and one period during one week), to *work through* ideas and problems, inspect their soundness and perspective, and advance towards clarity and coherence.

If possible, the class will also undertake a research project. It will split into 3-4 groups (depending upon total enrollment); each group will choose –at the beginning of the semester- an ongoing existing sustainability initiative such as a wind-farm, a particular forest region being harvested sustainably, a poverty-mitigating effort, an urban problem (or similar) and will analyze it from three perspectives:

its technological background, its governance structure, and its implementation and management. Each group will present advances in its research three times during the semester.

**Course etiquette:** The instructor turns his cell phone off during class and students are expected to do likewise. Class meetings are considered to enact a compact between the instructor and the students -that is, they have entered into an agreement to come together during the established times and fully engage with each other. Students who for any reason cannot make it to class should let the instructor know, especially if the student is expected to present or participate in a specific discussion.

**Course materials:**

Recommended Reference Book:

Fagerberg, J., Mowery, D., and Nelson, R. (Eds.). 2005. **The Oxford Handbook of Innovation**. Oxford University Press. Required and recommended articles and book chapters as listed below in the Topical Outline; a reading list in CD form shall be distributed.

**Prerequisites:** This is a capstone course for the MDP, but it can be useful for many other graduate students interested in the topics of natural resource management and/or innovation system theory.

**Course Requirements:**

- **Participation = 40%** (20% for presentation of assigned readings, 20% for class discussion). Getting each class or topic started effectively depends on leadership by the day's presenters. Attendance and informed discussion are essential; students should do very well if they are present, have read the assignments, and participate. This is a discussion-based and project-driven course. Students should participate voluntarily and assertively; the small class size will enable the instructor to call on reticent students for their input. The substance of students' comments will show whether each has read and thought about the assigned material.
- **Essays = 40%** (20% each for a midterm and a final essay). For each essay, students will select one of three topics distributed by the instructor, selected from any subject dealt with during class presentations and discussions. The assignment is to synthesize material presented in the classroom along with a more complete and up-to-date literature review, and discuss the current issues this subject presents to society, proposed solutions, and their prospects. Each essay should be about 5,000 well-edited words, plus tables and figures (if appropriate) and complete literature citations.
- **Group Project = 20%**. As described above, the class will divide into 4-5 groups who will research a project designed and operating as a "sustainable" solution to a defined problem; it should contemplate sustainability constraints in terms of growth, inputs, waste, ecological footprint, etc. Students will present on weeks 5, 10, and 15. They will be peer and instructor-graded.

**Grading:** Students' individual class presentations and discussion will be evaluated according to the following criteria: a) strength of their participation in class, including presentations and discussion; b) writing skills in their written submissions, especially in their midterm and final essays; and c) performance and ability to function as members of a student team in selecting, studying and analyzing a particular case from reality. Priority will be given to the clear presentation and discussion of new insights and evidence, as well as to the linkages made between the issues under study and to both their theoretical underpinnings and their practical implications. Students are expected to argue correctly their points of view—verbally and in writing— with precision, using evidence from substantial sources and be able to express their ideas with a clear structure, pointing out conclusions, uncertainties and possible avenues of research.

Criteria for grading Essays and Group Projects will be: thesis clearly stated, essay structure clear and easy to follow, well formatted and edited, word usage and grammar correct, written in an engaging and compelling style, concepts presented in your own words, argument factually correct and complete, peer-reviewed articles and other references cited appropriately, essay contains original

conclusions, conclusion backed by substantial evidence, and substance of the specific argument. An essay not handed in will receive zero credit.

**Grading Scale:**

|    |             |      |
|----|-------------|------|
| A  | 93.4-100 %  | 4.0  |
| A- | 90-93.3 %   | 3.67 |
| B+ | 86.7-89.9 % | 3.33 |
| B  | 83.4-86.6 % | 3.0  |
| B- | 80-83.3 %   | 2.67 |
| C+ | 76.7-79.9 % | 2.33 |
| C  | 73.4-76.6 % | 2.0  |
| C- | 70-73.3 %   | 1.67 |
| D+ | 66.7-69.9 % | 1.33 |
| D  | 63.4-66.6 % | 1.0  |
| D- | 60-63.3 %   | 0.67 |
| E  | <60.0 %     | 0.0  |

**Topical Outline:**

*Presentations by students will be based on research and adequate articles. The instructor will provide a number of papers, and students are encouraged to submit their own selections and topics. Literature in this field(s) is abundant and dynamic, so some papers and topics may suddenly change.*

*The following is a tentative list of topics for 2020*

**Week 1: Introduction to the course: a review of ecological principles and sustainability.**

**Week 2: Natural capital and ecosystem services**

**Week 3: Humankind and nature, natural resources. An overview of issues related to hunger, shelter, nutrition, health and survival.**

**Week 4: Agricultural Systems I: origins, and the evolution of different types of systems.**

**Week 5: Agricultural Systems II: the scale of agricultural systems, industrial agriculture and the food system; local economies, organic farming and the question of inputs. First Presentation of Group Projects –Technological Background.**

**Week 6: Biotechnologies and GMOs, a study in the application and outcomes of technical change, innovation and their consequences**

**Week 7: Crop rotations, recycling, restoration. Nutrient cycles and energy flows.**

**Week 8: Forests, forestry, deforestation and GHG emissions: a study in the relationship between science, technology and policy at various scales.**

**Week 9: The urban landscape, social and environmental opportunities, constraints, dilemmas.**

**Week 10: Practical project and water issues. Second Presentation of Group Projects – Governance Structures.**

**Week 11: Knowledge systems and research needs for sustainability; policy and technology constraints. Implications of climate change science.**

**Week 12: Energy and fuels. A look at the economic and environmental costs and efficiencies of various sources and technologies.**

**Week 13: Establishing relationships among knowledge, science, technology and innovation systems. Which stakeholders are involved? Uncertainty and risk.**

**Week 14: Foresight and policy –choosing among strategies for development. Which technologies for which aims?**

**Week 15: The dimensions of sustainability: studying and managing science and technology for innovation. Endogenous and exogenous drivers – Final Presentation of Group Projects.**

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.a.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.a.ufl.edu/public-results/>.

#### **Academic Honesty, Software Use, UF Counseling Services, Services for Students with Disabilities**

In 1995 the UF student body enacted a new honor code and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

In adopting this honor code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the university community. Students who enroll at the university commit to holding themselves and their peers to the high standard of honor required by the honor code. Any individual who becomes aware of a violation of the honor code is bound by honor to take corrective action. The quality of a University of Florida education is dependent upon community acceptance and enforcement of the honor code.

**The Honor Code: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.**

On all work submitted for credit by students at the university, the following pledge is either required or implied: **“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

The university requires all members of its community to be honest in all endeavors. A fundamental principle is that the whole process of learning and pursuit of knowledge is diminished by cheating, plagiarism and other acts of academic dishonesty. In addition, every dishonest act in the academic environment affects other students adversely, from the skewing of the grading curve to giving unfair advantage for honors or for professional or graduate school admission. Therefore, the university will take severe action against dishonest students. Similarly, measures will be taken against faculty, staff and administrators who practice dishonest or demeaning behavior.

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean or Student Honor Court. *(Source: 2008-2009 Undergraduate Catalog.)*

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor. This policy will be vigorously upheld at all times in this course.

**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. Both the Counseling Center and Student Mental Health Services provide 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. The Counseling Center is located at 301 Peabody Hall (next to Criser Hall). Student Mental Health Services is located on the second floor of the Student Health Care Center in the Infirmary.

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/](http://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/](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. 0001 Reid Hall, 392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)