

## **SUMA K5770 The Business and Ecology of Sustainable Forestry**

**Thursdays, 6:10-8:00 PM**  
**3 Credits**

**Instructor:** Ralph C. Schmidt, [ralphcschmidt@gmail.com](mailto:ralphcschmidt@gmail.com)  
**Office Hours:** Office hours will be held 1 hour prior to and 1 hour after the class session. The location is TBD. The instructor worked many years for UNDP and FAO on forest programs and has an intimate knowledge of international development and the organizations and systems involved. Students with a career interest in this area will be able to discuss these topics with the instructor outside of formal class time.  
**Response Policy:** Students may contact the instructor at any time through email, [ralphcschmidt@gmail.com](mailto:ralphcschmidt@gmail.com); the instructor will respond within 24 hours during the work week. When the instructor has consulting assignments outside the country, the response time may be longer, but the instructor is going to notify students in advance of any such travel abroad.

### **Course Overview**

The course intends to give an overview of forests – how they function, and how they can be managed sustainably. The course addresses both the ecology and economics of forests. Combining the study of these two disciplines is necessary to understand and develop management actions and solutions to deforestation. The emphasis in integrating ecology and economics is going to be on learning tools and techniques for managing forests. The course accounts both for North American and forests in other countries, including tropical ones. The instructor has worked on forest issues in over 50 countries, so that the focus will be international, but the management of domestic forests will also be important, especially as it contrasts with management practices elsewhere. There is considerable emphasis on forests' roles in carbon cycles and climate. In the latter part of the semester there will be a test with some quantitative emphasis, and then a 15 page paper, focusing on conditions and issues in a country or region of the student's choice, will be assigned. There will be oral presentations and discussions related to the papers. The instructor managed international forest programs for many years; if there is interest, international development issues and organizations can be discussed. There will be at least one week-end field trip and (easy) hike in a forest.

Current typical conceptions of forests are somewhat paradoxical: forests are considered marginal in sustainability, and yet they connect with many issues of central concern such as biodiversity, climate change, household energy for the poor, homelands for indigenous people, water and human shelter, to name a few. More specifically, forests provide a fruitful line of inquiry into many environmental issues, such as the complex balances within ecosystems, global cycling of elements, such as carbon, the nature of sustainability, and interactions between economic development and the conservation of nature. For example, we will study biodiversity in forests. Much biodiversity is found outside of forests, but our study will provide an understanding of the ecological dynamics involved with biodiversity, the possible management options, and its importance for human survival. The course is going to emphasize the role of forests in the carbon cycle and the contribution of deforestation to climate change.

The ecological understanding of forests will ground our study of forests as intimately connected with both environmental integrity and economic development. The economics of forests, including investment in forests, will be important in understanding how the value of timber can be used in sustainable forest management.

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By studying the interconnections between forests and sustainability, students are going to be able to analyze the management and development issues concerning forests that often arise, and be able to participate in the policy and management discussions around forests. The course includes a test with some quantitative emphasis, involving economic analyses of various forest investments. Students will also be required to write a 15-page paper, focusing on conditions and issues in a country or region of the students' choice. Students will also make oral presentations based on these papers, which will serve as the foundation of class discussions. The key criterion in evaluating the papers and discussions will be the inclusion of both ecological and economic principles and issues, covered during the course, into the national or regional analyses. There will be at least one short weekend field trip to a forest to illustrate key course concepts.

This course is approved for Area 3: Physical Dimensions and Area 5: General and Financial Management for the MS in Sustainability Management program.

### Learning Objectives

In the course, students will learn to:

- assess and analyze the functioning of forest eco-systems, including productivity, cycling of water and nutrients, and biodiversity;
- develop and formulate techniques to achieve management objectives such as conservation of watersheds and biodiversity, and production of wood and sequestration of carbon;
- analyze the economics and finance of wood (timber) production and carbon sequestration, including discounted cash flow comparisons;
- assess trade-offs between management objectives, evaluating complementarity and conflicts between objectives related to timber and fuelwood, water, aesthetic beauty and biodiversity;
- explore and analyze interactions amongst forests and poverty, and deforestation and climate change .

### Readings

#### Required Readings

- Ashton, Mark S. et al. *Managing Forest Carbon In A Changing Climate*. Dordrecht: Springer, 2012.
- Klemperer, W. David. *Forest Resource Economics And Finance*. New York: McGraw Hill, 2003.
- Perry, David A. *Forest Ecosystems*. Baltimore: Johns Hopkins University Press, 1994.
- Tercek, Mark R, and Jonathan S Adams. *Nature's Fortune*. New York: Basic Books, 2013.
- *Case Studies: forest management in the US and Salta, Argentina (Citations TBD)*
- *Forestland Group and Forestal Santa Barbara documents (Citations TBD)*

#### Recommended Readings

- Kellert, Steven R. *The Value of Life – Biological Diversity and Human Society*. Island Press. 1996.
- Kolbert, Elizabeth. *The Sixth Extinction – An Unnatural History*. Henry Holt. 2014
- Ostrom, Elinor. *Governing the Commons – The Evolution of Institutions for Collective Action*. Cambridge University Press. 1990.
- Schmitz, Oswald J. *Ecology and Ecosystem Conservation*. Island Press. 2007

## Resources

### *Columbia University Library*

Columbia's extensive library system ranks in the top five academic libraries in the nation, with many of its services and resources available online: <http://library.columbia.edu/>.

### *SPS Academic Resources*

The Office of Student Life and Alumni Relations (SLAR) provides students with academic counseling and support services such as online tutoring and career coaching: <http://sps.columbia.edu/student-life-and-alumni-relations/academic-resources>.

## Course Requirements (Assignments)

- Exam (20 Percent of Overall Grade)  
This exam will test students' understanding of ecological and economic concepts that inform sustainable forest management. Students will be presented with short descriptions of forestry projects, and they will be asked to perform environmental and financial analyses in evaluating the sustainability performance of the projects.
- Paper (50 Percent of Overall Grade)  
In this 15-page paper, students will focus on the forest management of a country or region of their choice, researching the conditions of the forests, including the environmental significance of these natural resources, as well as the economic pressures that are acting on them. Students will be expected to apply the ecological and economic understanding that they have developed in the course to analyze issues that affect these forests and to discuss any forest management interventions that these countries or regions have used to address these issues.
- Oral Presentation of Paper (10 Percent of Overall Grade)  
Students will make short oral presentations based on their papers. The presentations will offer an articulation of the most significant forest management issue that the country or region is facing, highlighting both its ecological and economic significance.
- Oral Participation in Class and Field Trip (20 Percent of Overall Grade)  
Throughout the course there will be opportunities for discussions of substance and issues. The instructor will ask questions about the assignments. There will be discussions on the final papers that are presented. There will be at least one week-end field trip and (easy) hike in a forest to illustrate forest structure and dynamics.

## Evaluation/Grading

- Exam  
The grade will be based on student understanding and ability to accurately present quantitative economic techniques that have been presented and discussed in class. Assignment will be graded on a scale of 0-100.
- Paper  
The grade will be based on the student's applying principles and concepts that have been presented and discussed in class to the situation of a specific country or region of North America. Six weeks before the paper is due, students should present an outline for their choice of topic and discuss the

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focus of the paper with the instructor. The grade will reflect the depth of the research and understanding of the country's situation presented in the paper. Papers should cover the biology and ecology of forests as well as economic and social conditions affecting their management (or mismanagement). Assignment will be graded on a scale of 0-100.

- Presentation  
The grade will reflect the quality of the presentation of the paper (substance and delivery), and the response to questions from students and the instructor. Assignment will be graded on a scale of 0-100.
- Participation and Field Trip  
The grade will be based on the students' questions and statements during class, reflecting their interest and comprehension. Assignment will be graded on a scale of 0-100.

The following clarifies how points awarded to individual assignments translate into letter grades for the course: A+ is for extraordinary work, above & beyond; A = 93-100, A- = 90-92, B+ = 87-89, B = 84-86, B- = 80-83, C+ = 77-79, C = 74-76, C- = 70-73, D = 66-69, F = 65 or fewer.

## Course Policies

### *Participation and Attendance*

You are expected to do all assigned readings, attend all class sessions, and engage with others in discussions. Your participation will require that you answer questions, defend your point of view, and challenge the point of view of others. If you need to miss a class for any reason, please discuss the absence with me in advance.

### *Late work*

There will be no credit granted to any written assignment that is not submitted on the due date noted in the course syllabus without advance notice and permission from the instructor.

### *Citation & Submission*

All written assignments must use MLA format, cite sources, and be submitted to the course website (not via email).

## Course Schedule/Course Calendar

Week 1 – Forest ecosystems and space: function and structure of forests. Forest types.  
Perry et al. 2008. Forest Ecosystems. Pp 1- 59.

Week 2 – Forest Ecosystems and time: disturbance and succession.  
Perry et al. 2008. Pp 60-117.

Week 3 – Biodiversity and forests; global deforestation  
Perry et al. 2008. 118- 189.

Week 4 – Tropical Forests and People: fuelwood, shifting cultivation, agroforestry, deforestation.

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Perry et al. 2008. 189-241

Ashton *et al.* 2012. *Managing Forest Carbon in a Changing Climate*. Springer. pp 285-302

Week 5 – Forest Economics: timber markets, internal rate of return, discounted cash flow, case study analysis

Klemperer. 1996. *Forest Resource Economics and Finance*. Pp 1- 58.

Week 6 - Optimal rotation for a stand

Klemperer. 1996. *Forest Resource Economics and Finance*. Pp 202 - 263

Week 7 – Evaluating Forestry Investments; Risk Analysis

Klemperer. 1996. *Forest Resource Economics and Finance*. Pp 302-329; 362- 391

Week 9 - Carbon sequestration in forests and significance to climate

Ashton *et al.* 2012. *Managing Forest Carbon in a Changing Climate*. Springer. pp 1-4; 31-44

Perry et al. 2008. *Forest Ecosystems*. Pp 301 – 332;

Week 10 - Carbon sequestration in tropical and temperate Forests

Ashton *et al.* 2012. *Managing Forest Carbon in a Changing Climate*. Springer. pp 51-101

Week 11 - The role of forests in global carbon budgeting and managing forests for carbon sequestration.

Ashton *et al.* 2012. *Managing Forest Carbon in a Changing Climate*. Springer. pp 165-248

Week 12 – Forest Services: Water, Biodiversity, Lumber, Energy

Tercek and Adams. 2013. *Nature's Fortune*. Pp 1 – 58; 81 – 104; 127-198.

Week 13 - Case Studies: forest management in the US and Salta, Argentina

Forestland Group and Forestal Santa Barbara documents

## School Policies

### *Copyright Policy*

Please note -- Due to copyright restrictions, online access to this material is limited to instructors and students currently registered for this course. Please be advised that by clicking the link to the electronic materials in this course, you have read and accept the following:

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted materials. Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of these specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement.

### *Academic Integrity*

Columbia University expects its students to act with honesty and propriety at all times and to respect the rights of others. It is fundamental University policy that academic dishonesty in any guise or personal conduct of any sort that disrupts the life of the University or denigrates or endangers members of the

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University community is unacceptable and will be dealt with severely. It is essential to the academic integrity and vitality of this community that individuals do their own work and properly acknowledge the circumstances, ideas, sources, and assistance upon which that work is based. Academic honesty in class assignments and exams is expected of all students at all times.

SPS holds each member of its community responsible for understanding and abiding by the SPS Academic Integrity and Community Standards posted at <http://sps.columbia.edu/student-life-and-alumni-relations/academic-integrity-and-community-standards>. You are required to read these standards within the first few days of class. Ignorance of the School's policy concerning academic dishonesty shall not be a defense in any disciplinary proceedings.

*Accessibility*

Columbia is committed to providing equal access to qualified students with documented disabilities. A student's disability status and reasonable accommodations are individually determined based upon disability documentation and related information gathered through the intake process. For more information regarding this service, please visit the University's Health Services website: <http://health.columbia.edu/services/ods/support>.