

THE UNIVERSITY OF BRITISH COLUMBIA

FACULTY OF FORESTRY

FRST 411/532c: Complex Adaptive Systems, Global Change Science and Ecological Sustainability

COURSE OUTLINE - 2015 Fall Term

Instructor: Dr. Suzanne, Simard (suzanne.simard@ubc.ca)

Meeting Time / Place: Monday, 15:00-17:00, FSC 1611

Syllabus and Timetable available at: <http://frst411.forestry.ubc.ca/>

Course Description

Using the scientific literature, students will explore the main concepts of Complex Adaptive Systems (CAS), view a range of systems through the lens of CAS theory, and discuss how CAS can be used to manage natural and social environments for multiple goals. Specific topics that will be examined are Global Change and Environmental Sustainability.

Recommended Textbooks:

- Puettmann, Klaus J., K. David Coates, and Christian Messier. 2009. *A Critique of Silviculture: Managing for Complexity*. Washington DC: Island Press

Recommended Readings: Readings will be assigned at each lecture. The readings will be selected from the current scientific literature, the reference list on the website, and the following books:

- Chapin, III, F. Stuart, Kofinas, Gary, P., and Folke, Carl (Editors). 2009. *Principles of Ecosystem Stewardship Resilience-Based Natural Resource Management in a Changing World*. New York: Springer. 409 pp. (ISBN 978-0-387-73032-5 paper).
- Pagel, Mark. 2013. *Wired for Culture: Origins of the Human Social Mind*. New York: W.W. Norton & Company. 416 pp. ISBN-10: 0393344207
- Messier, Christian, Klaus J. Puettmann, and K. David Coates. 2013. *Managing Forests as Complex Adaptive Systems: Building Resilience to the Challenge of Global Change*. Earthscan: Routledge. 368 pp. ISBN: 9780415519779.
- Westely, Frances, Zimmerman, Brenda, and Patton, Michael. 2007. *Getting to Maybe: How the World is Changed*. Vintage Canada Edition. 272 pp. ISBN-10: 067931444X.
- Johnson, Neil. 2007. *Simply Complexity: A Clear Guide to Complexity Theory*. Oxford: Oneworld Publications.

Module Introduction

Introduction Modules (weeks 1-3):

Introduction to Complex Adaptive Systems (CAS). Students will read chapters from assigned books and the literature. Three seminars will be given by Suzanne Simard.

Assignment 1: *Students will write a reflective essay about the interactions between ecology, resilience and adaptability (~500 words).*

Group-project Module (weeks 4-6):

Each group will involve approximately *five* students, depending on the class size. Students are expected to ***critically analyze and discuss*** CAS concepts within the context of global change and natural resource management.

Assignment 2: *One 20-30 minute group presentation. This will involve critical review of one focus article plus one supporting article chosen by the students from the general literature or a list provided by the instructor. The presentation will be followed by a 20 minute question period. Usually two groups will present per class. You will register for your presentation date on the first day of classes.*

Requirements for the group presentation:

Create a PowerPoint presentation based on the selected articles (and supporting paper and additional literature as needed) that:

a. Introduces the general topic;

b. Outlines the focus paper, and critically evaluates its approach, methods and interpretation;

c. Places the focus paper into context of CAS, global change and natural resource management;

d. Concludes with at least five questions arising from the paper to stimulate class discussion. These questions must be sent to the other students in the class three days in advance of the presentation.

The group presentations will be peer-reviewed and graded by students during the class. A single grade will be assigned to the whole group. Grades will be filled out on a form by the students and handed to the instructor at the end of the class. The instructor will also grade and determine the final grade based on the composite grades.

Grading will determined on the basis of *five criteria*:

- *covering the basics (10 points)*
- *clarifying the rough areas (10 points)*
- *further questions (10 points)*
- *working as a team (10 points)*
- *presentation skills (10 points)*

Guest lecture and Module summary (Weeks 6-8):

Three guests will give lectures on more specific CAS topics.

Synthesis module (weeks 9-13):

Students will critically analyze and then discuss recently published papers that **apply** concepts of CAS to natural resource management in our changing environment.

Assignment 3 (Undergraduate student): *One final paper for each student (maximum of 1500 words), due on the last day of class.*

Assignment 3 (graduate student): *One presentation (~10 min.) about the students' topic of interest based on the earlier selected research article or their own research progress and one final paper (maximum of 3000 words), due on the last day of class.*

Grading:

Class Participation (20%)

Short assignment (15%): Assignment 1

Group Project (35%): Assignment 2

Final paper (30%): Assignment 3