Course Information
Location: ARCT 183
Meeting Time: TR 11:30-1:00

Instructors
Terry Chapin: 195 Arctic Health, 474-7922, terry.chapin@alaska.edu, office hours TR 1-2
Courtney Carothers: 207B O'Neill, 474-5329, clcarothers@alaska.edu, office hours TR 10-11

Course Description
This course develops the basic principles that govern sustainability, resilience and change of linked ecological-social systems. We explore the roots of these concepts as they have developed in various disciplinary fields. We then explore the integration of these concepts at various scales through student-led projects. Emphasis throughout will be on societal goals, tradeoffs, drivers of stability and change, feedbacks and interactions, emergent properties, and temporal and spatial scales. Sustainability, resilience, and vulnerability are general frameworks for integration.

One purpose of the course is to explore the problem-solving implications of interdisciplinary thought and practice. Although the study of complex adaptive systems requires interdisciplinary organization, the focus here will be on understanding the problem. Apart from the theoretical frameworks presented and discussed, we hope to explore the opportunity for practical application of course topics and how theory structures observations and informs research and design of “ideal” solutions to real-world problems but then must deal with the realities of power and politics. Through all of the discussions we will also look at the way that different disciplines describe people, places, and ecosystems and stress the common ground that integrates across disciplines.

Course Goals/Learning Objectives
- Develop a conceptual framework for exploring sustainability and resilience
- Develop skills applying basic principles to the analysis of real-world issues related to resilience and sustainability
- Apply these principles through student led projects at various scales: local, regional/national, and global with focus on integrating social, cultural, economic and ecological dimensions of systems.

Assignments/Grades/Requirements
You are expected to complete all of the assigned readings in advance of the class for which they are assigned and to come to every class prepared to discuss these readings. You will be graded on a combination of your contributions to class discussion, a short paper that applies sustainability concepts to a specific issue, a mid-term exam, contributions to the final set of student-led discussions, and a final research paper based on the student-discussion in which you participated. Rather than viewing this course as rigidly organized in terms of a specific typology, consider the outline below to be fluid and responsive to student interests and to ideas that develop during class discussions.
Contributions to class discussion will be worth 10% of the final grade; the written assignment, 20%; the "take-home" mid-term, 30%; research contribution to final paper and student-led discussions after the mid-term count for 40% of the final grade. In the final accounting, engagement in discussion and learning of new perspectives counts for much in all areas!

The written assignment before the midterm will consist of a short (2-3 single-spaced pages) description of how the principles and ideas discussed in class can be applied to a specific real-world issue, such as fisheries, sustainability of rural communities, or world trade. The paper will apply ideas from the class sections on sustainability, vulnerability, adaptability, and resilience. We encourage you to select your thesis topic or another issue with which you are familiar, so you can focus on applying the concepts of sustainability rather than learning about a new topic.

The mid-term exam will consist of several discussion questions that require integration and application of the material presented in class to the implementation of sustainability planning with respect to addressing a specific real-world issue/problem. The exam will be an open-book take-home exam.

The last four weeks will be student-led classes that address sustainability, vulnerability, and resilience at one of several different scales (local, regional, or global, cross-scale bridging), while recognizing the interactions that occur between the focal scale and other scales. Each student will be responsible for organizing and co-presenting material and leading discussion about one of these scales. As a class, students can choose to focus on one topic (e.g., fisheries or climate change) for this last section of the course, or each team can select different topics for their scale. We will discuss the group project and presentation in more detail in Week 3. A group project outline and individual reflection paper will be due in Week 8.

Final papers will be written individually by each student. The paper will be 5-10 single-spaced pages in length and will address sustainability, vulnerability, and resilience at the scale which you selected for class presentations. Students are encouraged to utilize the setting that they presented in class or another setting with which they are familiar in choosing topics areas for their final papers. Students are also encouraged to visit with the instructors to discuss topic selection and development.

The following grading scale will apply:

- **A** - 90 to 100 (A- 90-91; A+ 99-100)
- **B** - 80 to 89 (B- 80-81; B+ 88-89)
- **C** - 70 to 79 (C- 70-71; C+ 78-79)
- **D** - 60 to 69 (D- 60-61; D+ 68-69)
- **F** - < 60

The instructors reserve the right to modify the final grade in consideration of notable progress demonstrated by an individual, or unforeseen and extenuating circumstances. In such cases, extra credit assignments and/or makeup work may be used at the discretion of the instructors. Assignments handed in after the due dates will receive reduced credit.
**Instructional Methods**
The course will use a combination of lectures, student discussions and presentations, and guest speakers. This class is interactive, relying on strong student contribution. We hope to engender a respectful and productive atmosphere that encourages this joint class exploration of course themes. This class will work best if everyone participates.

**Student Code of Conduct**
According to the UAF code of conduct “Students will not collaborate on any quizzes, in-class exams, or take-home exams that will contribute to their grade in a course, unless the instructor of the course grants permission…. Students will not represent the work of others as their own. A student will attribute the source of information not original with himself or herself (direct quotes or paraphrases) in compositions, theses, and other reports…. No work submitted for one course may be submitted for credit in another course without the explicit approval of both instructors…….” Students are expected to abide by the **UAF Student Code of Conduct**.

An explanation of plagiarism and how to properly cite sources are available at the following two sites:
http://www.uaf.edu/library/instruction/handouts/Plagiarism.html
http://www.uaf.edu/library/instruction/handouts/Citing.html
Plagiarism is grounds for course failure.

**UAF Policies Disabilities Services**
The University of Alaska Fairbanks is committed to providing equal access for students with disabilities. The Office of Disability Services implements the Americans with Disabilities Act (ADA) and insures that UAF students have equal access to the campus and course materials. We will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities. If you have a physical or learning disability, please advise us in writing of any special consideration necessary by the beginning of the second class. We will do everything possible to accommodate you in accordance with the Americans with Disabilities Act. Priority seating close to the board and screen is provided for students who need to be in close proximity to the board.

**Blackboard & Distance Delivery**
We will use the UAF Blackboard site for this course to send emails and post readings, assignments and other materials. Blackboard can be accessed at http://classes.uaf.edu. Email notification through Blackboard will not work for a non-UAF email address. If you principally use a non-UAF email service, (such as yahoo) go to your UAF account and forward your UAF email to that address. You are responsible for all emails sent to your UAF email account. Blackboard resources, links and support information are available at the UAF Blackboard homepage.

Students in the course will be based in Fairbanks, Juneau and other sites. We will connect our classrooms via Video Conferencing Services (http://www.alaska.edu/oit/vcs/). If you have any trouble with the video conferencing, please notify the instructors or call the Video Conferencing Office at: 907-474-8390. The Video Conference established for our class can also be accessed via telephone during remote travel. The call-in number is: 1-800-570-3591 and the PIN is: 4379201.
Course Materials


Additional Readings (available electronically)


Helpful References

Millenium Assessment Reports: “The Millennium Ecosystem Assessment assessed the consequences of ecosystem change for human well-being. From 2001 to 2005, the MA involved the work of more than 1,360 experts worldwide. Their findings provide a state-of-the-art scientific appraisal of the condition and trends in the world’s ecosystems and the services they provide, as well as the scientific basis for action to conserve and use them sustainably.”
# Course Outline (tentative)

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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
<th>Lead</th>
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| 1    | Thurs 9/2 | Introduction to Course  
What's the problem?  
- Rapid changes that are social *and* ecological  
  Need social-ecological approach  
- Globalization: increasing global interconnectedness  
  Requires systems framework | All           |      |
|      | Tues 9/7 | What does sustainability mean in a rapidly changing world?  
- Sustainable development in developing nation  
  Bruntland Report  
- Limits to growth in developed nations: Meadows  
- Tension between improving well-being and conserving ecosystem services  
- Tension between growth and Earth's finite resources | PES Ch 1  
MEA 2005 | TC   |
|      | Thurs 9/9 | What are the dimensions of sustainability?  
- Ecological Dimensions  
  - Provisioning services (food, water, fuel)  
  - Regulating services (floods, fire, climate, water quality)  
  - Cultural services (ties to place, recreation)  
  - Stewardship for multiple services  
  Discuss Group Project & Presentation | PES Ch 2  
Bennett 2009 | TC   |
|      | Tues 9/14 | Social Dimensions  
- Theories and concepts from the social sciences  
- Historical ecological approaches  
- Well-being, livelihood approaches  
- Formal and informal institutions | Kirch 1997  
Moran 2010 | CC   |
|      | Thurs 9/16 | Political-Economic Dimensions  
- Political economy and political ecology  
- Structure/agency  
- Power relations  
- Forms of knowledge | Robbins 2004 | CC   |
|      | Tues 9/21 | How do we foster sustainability?  
- Short paper due: Sustainability of an "issue"  
  Guest Lecturer: Joshua Greenberg  
  Managing for Growth or Happiness? | PES Ch 10 & 12  
JG           |      |
|      | Thurs 10/7 | Economic framework:  
- Neoclassical economics  
- Inclusive wealth; natural, built, human & social capital  
- Globalization, production, distribution | Arrow et al.  
2004;  
Robards & Greenberg 2007 | JG   |
|      | Tues 10/12 | Reducing vulnerability (dimensions of risk)  
- Reduce exposure to hazards and stresses  
- Reduce sensitivity to hazards and stresses  
- Social production of vulnerability | Adger 2006;  
Oliver-Smith 2004 | TC/CC |
<p>|      | Thurs 10/14 | Guest Lecturer: Shauna Burnsilver | TBA           | SB   |</p>
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<tr>
<th></th>
<th>Tues 10/19</th>
<th>Group Project Outline &amp; Reflection Paper Due</th>
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<td></td>
<td>Thurs 10/21</td>
<td>Sustaining cultural pluralism</td>
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<td>- Sustaining diversity of norms, worldviews</td>
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<td>- Persistence of culture in times of change</td>
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<td>8</td>
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<td>Thorton 2007; Colic 2007 CC</td>
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<td>Tues 10/26</td>
<td>Resilience and adaptation</td>
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<td>- Scope of adaptation: coping, adapting, transforming</td>
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<td>Smit &amp; Wandel 2006 TC</td>
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<td>Thurs 10/28</td>
<td>- Fostering diversity: seeds of adaptation &amp; renewal</td>
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<td>- Cultural legacies and social memory</td>
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<td>- Innovation and social learning: adaptive management</td>
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<td>Carpenter &amp; Brock 2008 TC</td>
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<td>Tues 11/2</td>
<td>Adaptive Governance</td>
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<td>- Rigidity traps</td>
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<td>Thurs 11/4</td>
<td>- Building responsive institutions</td>
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<td>- Institutional fit</td>
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<td>- Incentives and costs of change (transaction costs)</td>
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<td>- Community-based governance</td>
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<td>PES Ch 4 GK?</td>
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<td>Tues 11/9</td>
<td>Transformation</td>
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<td>11</td>
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<td>- Avoiding undesirable transformations</td>
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<td>- Uncertainty, thresholds, regime shifts</td>
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<td>- Navigating transformations</td>
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<td>- Building resilience of the new system</td>
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<td>Thurs 11/11</td>
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<td>Chapin et al. 2010</td>
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<td>Costanza et al. 2010</td>
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**Integrating Sustainability Concepts**

|   | Tues 11/16  | Mid-term take-home exam due               |
| 12|             | Integrating Sustainability Concepts (Team presentations) |
|   | Thurs 11/18 |                                           |

|   | Tues 11/23  | Integrating Sustainability Concepts (Team presentations) |
| 13|             | Thanksgiving Holiday, No Class            |
|   | Thurs 11/25 |                                           |

|   | Tues 11/30  | Integrating Sustainability Concepts (Team presentations) |
| 14|             |                                                          |
|   | Thurs 12/2  |                                                           |

|   | Tues 12/7   | Integrating Sustainability Concepts (Team presentations) |
| 15|             |                                                          |
|   | Thurs 12/9  |                                                           |