The course provides an overview of the complex relationships between ecological and social systems that define many problems in sustainable development. After the students are introduced to basic concepts, the course will focus on in-depth study on several current topics central to sustainable development. The emphasis is on the multiple perspectives -- environmental, social and economic—required to understand and develop solutions to problems in sustainable development. The topical units this year will include: designing a sustainable meal, revisiting collapse stories from a social-ecological lens, watershed protection and conservation, and theories of social-ecological systems. The class will include a field trip to the New York watershed in the Catskills and a dinner to cook and eat the sustainable meal.

The goals of the class are to:

- Help students conceptualize connections and interactions between society and the environment
- Help students understand tradeoffs and synergies inherent in all questions about sustainable development
- Help students apply critical thinking to analyze possible approaches to achieve sustainable development accounting for perspectives of different decision-makers and stakeholders
- Introduce tools for analysis of social-ecological systems as complex systems

The course will involve two, 75 minute sessions per week for a 3-point course. Classes will be a mix of lecture, active discussion, and hands-on exercises. Students will write several short response papers and a final paper.

PREREQUISITES
SD3300 Challenges of Sustainable Development, EESC2330 Science of Sustainable Development

INSTRUCTOR
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Office Hours: Monday 10:00am – 2pm or by appointment (please email to confirm)

TEACHING ASSISTANT
Hannah Papageorge
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Office Hours: 2-4pm Tuesdays
<table>
<thead>
<tr>
<th>CLASS</th>
<th>DATE</th>
<th>UNIT</th>
<th>TOPIC</th>
<th>ASSIGNMENT</th>
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<tbody>
<tr>
<td>0</td>
<td>Wed, Sept 6</td>
<td>INTRODUCTION</td>
<td>Introduction and plans for semester</td>
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<tr>
<td>1</td>
<td>Mon, Sept 11</td>
<td></td>
<td>What is a socio-ecological system?</td>
<td>Readings</td>
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<td>2</td>
<td>Wed, Sept 13</td>
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<td>Example of socio-ecological system – the Irish Potato Famine</td>
<td>Readings Blog 1: If you were in a position of authority at the time, what measures would you have taken to alleviate the Irish Potato Famine? Would you address the social or ecological factors?</td>
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<td>3</td>
<td>Mon Sept 18</td>
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<td>What is your theory of change?</td>
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<td>4</td>
<td>Wed, Sept 20</td>
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<td>Applying a theory of change to a common resource problem: your dorm fridge</td>
<td>Blog 2: What is one change you would like to make to promote sustainable development?</td>
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<td>5</td>
<td>Mon, Sept 25</td>
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<td>Theories of change for problems in sustainable development</td>
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<td>6</td>
<td>Wed, Sept 27</td>
<td>DINNER AS A SES</td>
<td>How do we decide on a sustainable menu?</td>
<td>Assignment 1: Using a theory of change, how could you achieve the change in blog 2?</td>
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<td>7</td>
<td>Mon, Oct 2</td>
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<td>Criteria and options for our sustainable dinner</td>
<td>Blog 3: What are your criteria for a sustainable dinner? Propose a menu.</td>
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<td>8</td>
<td>Wed, Oct 4</td>
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<td>Menu decisions</td>
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<td>9</td>
<td>Mon, Oct 9</td>
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<td>Food footprints: Guest speaker Kyle Davis</td>
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<td>10</td>
<td>Wed, Oct 11</td>
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<td>DINNER</td>
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<td>12</td>
<td>Wed, Oct 18</td>
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<td>Green infrastructure design for the Hudson Valley: Guest speaker Kate Orff</td>
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<td>13</td>
<td>Mon, Oct 23</td>
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<td>How replicable is the Catskills model?</td>
<td>Blog 4: Choose a city somewhere in the world. Do you think the Catskills model would work</td>
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<td>Date</td>
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<td>14</td>
<td>Wed, Oct 25</td>
<td>Agriculture in the Hudson Valley: Guest speaker Jeffrey Potent</td>
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<td>Sat, Oct 28-29</td>
<td><strong>CATSKILLS FIELD TRIP</strong></td>
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<td>15</td>
<td>Mon, Oct 30</td>
<td><strong>COMPLEXITY SCIENCE</strong> What makes a system complex?</td>
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<td>16</td>
<td>Wed, Nov 1</td>
<td>Modularity and connectivity in complex systems</td>
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<td>Mon, Nov 6</td>
<td><strong>ACADEMIC HOLIDAY</strong></td>
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<td>17</td>
<td>Wed, Nov 8</td>
<td>Simulating complex systems: Lisa Dale</td>
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<td>18</td>
<td>Mon, Nov 13</td>
<td>Global food trade: Guest speaker Michael Puma</td>
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<td>19</td>
<td>Wed, Nov 15</td>
<td>Resilience, diversity and redundancy in complex systems</td>
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<td>Mon, Dec 4</td>
<td>Back to wicked problems, leverage points and adaptive management</td>
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<td>20</td>
<td>Mon, Nov 20</td>
<td>Emergent properties in complex systems</td>
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<td>Wed, Nov 22</td>
<td><strong>Day before Thanksgiving – no class</strong></td>
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<td>21</td>
<td>Mon, Nov 27</td>
<td>Regime shifts/ societal collapse</td>
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<td>22</td>
<td>Wed, Nov 29</td>
<td>Examples of collapse</td>
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<td></td>
<td>Mon, Dec 4</td>
<td>Back to wicked problems, leverage points and adaptive management</td>
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<td>23</td>
<td>Wed, Dec 6</td>
<td>WRAP UP Reconsidering your theory of change</td>
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<td>24</td>
<td>Mon, Dec 11</td>
<td><strong>LAST DAY CONCLUSIONS</strong> Final paper: How theories on socio-ecological systems apply to sustainable development</td>
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READINGS (this is preliminary list to be revised during the semester):

Introduction Unit:

For Mon, Sept 11 (Class 1):


For Wed, Sept 13 (Class 2):

Blog 1: If you were in a position of authority at the time, what measures would you have taken to alleviate the Irish Potato Famine? Would you address the social or ecological factors?

Theory of Change Unit:

For Mon, Sept 18 (Class 3):

For Wed, Sept 20 (Class 4):

Blog 2: What is one change you would like to make to promote sustainable development?

For Mon, Sept 25 (Class 5):

Work on Assignment 1: Using a theory of change, how could you achieve the change in blog 2?

Dinner as a Social-Ecological System Unit:

For Wed, Sept 27 (Class 6):
Skim through these papers and choose 2 to read in detail:

Garnett, Tara. "Where are the best opportunities for reducing greenhouse gas emissions in the food system (including the food chain)?." Food policy 36 (2011): S23-S32.


**For Mon, Oct 2 (Class 7):**
Blog 3: What are your criteria for a sustainable dinner? Propose a menu.

**For Wed, Oct 4 (Class 8):**
Look through the blog 3 entries and come to class prepared to argue for/against menu choices

**For Mon, Oct 9 (Class 9):**
Readings from Kyle Davis on footprints

**For Wed, Oct 11 (Class 10):**
Bring your appetite for dinner.

Work on Assignment 2: Your friend asks your advice on sustainable eating. What do you advice? Justify with objective criteria.

**Catskills Watershed Unit:**

**For Mon, Oct 16 (Class 11):**

**For Wed, Oct 18 (Class 12):**
Readings from Jeff Potent

**For Mon, Oct 23 (Class 13):**

Play around in [http://water.nature.org/waterblueprint/#/intro=true](http://water.nature.org/waterblueprint/#/intro=true)

Blog 4: Choose a city somewhere in the world. Do you think the Catskills model would work for that city? Why or why not?

**For Wed, Oct 25 (Class 14):**
Orff, K., 2016, Toward an Urban Ecology (chapter from Kate Orff)

**Complexity Science Unit:**

**For Mon, Oct 30 (Class 15):**

**For Wed, Nov 1 (Class 16):**
Read chapter 1 in: [http://barabasi.com/networksciencebook/](http://barabasi.com/networksciencebook/)


Blog 5: Why might trade and globalization help or hinder people’s access to food?

**For Wed, Nov 8 (Class 17):**
Explore one of the following software and be prepared to share with class:
- [https://ccl.northwestern.edu/netlogo/download.shtml](https://ccl.northwestern.edu/netlogo/download.shtml)
- [http://www.cytoscape.org/](http://www.cytoscape.org/)
- [https://www.iseesystems.com/store/products/stella-online.aspx#free](https://www.iseesystems.com/store/products/stella-online.aspx#free)

**For Mon, Nov 13 (Class 18):**
Readings from Michael Puma on global food trade

**For Wed, Nov 15 (Class 19):**


For a popular version of resilience, read the introductory chapter of Zolli, Andrew, and Ann Marie Healy. *Resilience: Why things bounce back*. Simon and Schuster, 2012. You can download as a sample in iTunes (Optional to keep reading if you like this chapter.)

Assignment 3: Considering the global food trade as a complex system, what changes would you make to achieve sustainable food systems?

**For Mon, Nov 20 (Class 20):**


**For Mon, Nov 27 (Class 21):**


**For Wed, Nov 29 (Class 22):**
Read at least one other paper in the special issue on Critical Perspectives on Historical Collapse [http://www.pnas.org/content/109/10.toc](http://www.pnas.org/content/109/10.toc)

Blog 6: Give an example of how a society could have avoided collapse (based on one of the papers you have read)
For Mon, Dec 4 (Class 23):
Blog 7: Did our discussion of complexity theory change your thinking about sustainability?

For Wed Dec 6 (Class 24):
Reread your blog 2 and assignment 1. Think about whether you have changed your views.

For Mon, Dec 11 (Class 25):
Bring your final thoughts about socio-ecological systems and their relevance for sustainable development.
Work on final paper: How theories on socio-ecological systems apply to sustainable development

ASSIGNMENTS:

Short, written assignments:

There will be three short, written assignments during the semester. Guidelines for these assignments are:

1) Each assignment should be 2 to 3 double-spaced pages.

2) Assignments are due at 8pm the night before the day listed on the syllabus. You need to upload your assignment through courseworks.

3) Your assignment needs to include appropriate references and credits for sources that you used. References are not included in the page limit.

4) The assignment should contain your individual thoughts. Assignments are not group projects although you will be working in groups on the sustainable menu.

Your paper will be shared with the entire class immediately after the due date and will form the basis for the discussion in the class the next day. Late assignments will lose 10% of the assignment value for each day late. Late assignments will also affect your participation grade because you will not have your paper to discuss in class.

Final paper:

The final paper will be due the time that the final exam would have been scheduled for the class. The paper will be 6 to 8 double-spaced pages. You will choose a topic or issue related to some aspect of sustainable development. The topic should have both social and ecological elements. Examples are protected areas and conservation, dam construction or some other infrastructure development, the California drought, carbon markets, payments for ecosystem services and climate adaptation (be creative, think of your own topics related to your interests). The topic can be either current or historical. Your paper should include 1) a description of the topic, 2) the social and ecological aspects, 3) how theories in socio-ecological systems relate to the topic and 4) your ideas on how to reconcile social and ecological conflicts for this topic. Include a bibliography of sources.

Blog posts:

There will be seven blog posts during the semester. Posts should be one or two paragraphs. Feel free to comment on other posts but please be respectful. Blogs should be posted on the Courseworks site.

GRADING AND EVALUATION:

Grades will be based on:
Assignments: 3 short papers during the semester (30%)  
Participation in class and blogs (50%)  
Final paper (20%)