ENR 5268
SOILS AND CLIMATE CHANGE

Spring 2018
Course Outline

2 Credit Hours
460 Kottman Hall
Tuesdays 2:20-4:10

Instructors:

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COURSE OBJECTIVES

This course is designed for students interested in learning basic soil and geologic processes as they impact climate change and are impacted by it. The syllabus meets the curriculum needs of students in Soil Sciences, Earth Sciences, Environmental Sciences, Natural Resources, Food, Agric. & Biol. Engineering, Horticulture and Crop Sciences, Forestry, Civil Engineering, Environmental Engineering, Public Policy, and Agric. Economics.

LEARNING OUTCOMES

After completion of this course, students will be able to:
1. Document soil processes and address climate change issues.
2. Apply application of soil properties to the following:
   (i) Greenhouse effect, geologic climate changes, and abrupt climate change,
   (ii) Global C cycle (global C cycle: geologic, current),
   (iii) Gaseous emissions (CO2, CH4, N2O),
   (iv) Biogeochemical cycles, coupled cycles of C, N, P, S and H2O,
   (v) Carbon sequestration,
   (vi) Terrestrial and geologic sequestration, processes,
4. Soil Quality and C Sequestration.
5. Biofuels
6. Trading of C credits and the Kyoto Treaty

INSTRUCTORS

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GRADING

Three homework sets.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1-9-18</td>
<td>Greenhouse effect, and the global C cycle: current (RL)</td>
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<tr>
<td>1-16-18</td>
<td>Global carbon cycle - Geologic (AC)</td>
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<tr>
<td>1-23-18</td>
<td>The Anthropocene (RL)</td>
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<td>1-30-18</td>
<td>C sequestration strategies: terrestrial sequestration (RL)</td>
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<tr>
<td>2-6-18</td>
<td>Land use and the historic C loss (Homework 1) (RL)</td>
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<td>2-13-18</td>
<td>Soil Management and the Positive Ecosystem C Budget (RL)</td>
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<td>2-20-18</td>
<td>Past climate changes, abrupt climate change (AC)</td>
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<td>2-27-18</td>
<td>Soil erosion and the global carbon cycle (RL)</td>
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<td>3-6-18</td>
<td>Fossil fuel emissions and geologic sequestration (AC) (Homework 2)</td>
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<td>3-12-18</td>
<td>Spring Break</td>
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<td>3-16-18</td>
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<tr>
<td>3-20-18</td>
<td>Permafrost soils and the positive feedback (Klaus Lorenz)</td>
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<td>3-27-18</td>
<td>Fate and transport of C in aquatic ecosystems (AC)</td>
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<td>4-3-18</td>
<td>Managing soil C, Biofuels feedstock, Biochar, Trading C (RL)</td>
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<td>4-10-18</td>
<td>Farming carbon (RL) (Homework 3)</td>
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<td>4-17-18</td>
<td>Biogeochemical processes and the global C cycle (AC)</td>
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<td>4-24-18</td>
<td>COP-21, 22, 23 and climate change (RL)</td>
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(RL) = Rattan Lal  
(AC) = Anne Carey