THE OHIO STATE UNIVERSITY

ENR 5268
SOILS AND CLIMATE CHANGE

Spring 2020
Course Outline

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

Instructors:

Dr. R. Lal
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Dr. W.B. Lyons
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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 (CO_2, CH_4, N_2O),
    - (iv) Biogeochemical cycles, coupled cycles of C, N, P, S and H_2O,
    - (v) Carbon sequestration,
    - (vi) Terrestrial and geologic sequestration, processes,
3. Measurement of soil C pool and fluxes.
4. Soil Quality and C Sequestration.
5. Biofuels
6. Trading of C credits and the Kyoto Treaty
7. Climate Resolutions by UNFCCC

INSTRUCTORS

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GRADING

Three homework sets.

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1-7-20	Greenhouse effect, and the global C cycle: current (RL)
1-14-20	Global carbon cycle - Geologic (BL)
1-21-20	The Anthropocene (RL)
1-28-20	C sequestration strategies: terrestrial sequestration (RL)
2-4-20	Past climate changes, abrupt climate change (BL)
2-11-20	Land use and the historic C loss (RL) (Homework 1)
2-18-20	Fossil fuel emissions and geologic sequestration (BL) (Homework 2)
2-25-20	Soil Management and the Positive Ecosystem C Budget (RL)
3-3-20	Soil erosion and the global carbon cycle (RL)
3-9-20–3-13-20	**Spring Break**
3-17-20	Permafrost soils and the positive feedback (RL) (Homework 3)
3-24-20	Fate and transport of C in aquatic ecosystems (BL)
3-31-20	Biogeochemical processes and the global C cycle (BL)
4-7-20	Managing soil C, Biofuels feedstock, Biochar, Trading C (RL)
4-14-20	Farming carbon (RL)

(RL) = Rattan Lal
(BL) = Berry Lyons