SOILS 420-- Remediation of Contaminated Soils (3 credits)
Fall Semester

Instructor: Professor Sridhar Komarneni
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Course Objective: The overall objective of this course is to educate students on the basic principles and technical aspects of remediation of contaminated soils.

Overview: Soils 420 is an introduction to the basic principles and techniques of remediation of contaminated soils. The course assumes that you have a background in General Chemistry. Deficiency in Chemistry should not prevent you from taking this course, but please discuss with the instructor.

Course Outline:

1. Terminology and definitions

2. Regulatory Background

3. Characteristics of wastes
    - (i) Non-radioactive wastes
        - (a) Inorganic wastes
        - (b) Organic wastes
        - (c) Mixed wastes
    - (ii) Radioactive wastes
        - (a) Inorganic wastes
        - (b) Organic wastes
        - (c) Mixed wastes

4. Characterization and Identification of contaminated sites

5. Technologies for remediation
    - (i) Established technologies: Principles and practices
        - (a) Solidification/stabilization (the most widely practiced)
        - (b) On-site incineration
        - (c) Off-site incineration
    - (ii) Innovative technologies: Principles and practices
        - (a) Vacuum extraction
        - (b) Ex-situ bioremediation
        - (c) In-situ bioremediation
        - (d) Thermal desorption
        - (e) Soil washing
        - (f) In-situ flushing
        - (g) In-situ vitrification
        - (h) Solvent extraction
        - (i) Dechlorination
        - (j) Chemical treatment
        - (k) Ex-situ supercritical oxidation
        - (l) Phytoremediation

Required books:

- Chemical Fixation and Solidification of Hazardous Wastes, 1990, Printed and produced by Penn State Copy Centers and sold at Penn State Bookstore.

Breakdown of Percentages for Final Grade:

Class Attendance	10%
Midterm 1	30%
Midterm 2	30%
Final Exam	30%