
Contaminated Site Remediation

(CEMM425; 3 UG/ 4G Credit Hours)

Instructor:

Prof. Krishna R. Reddy
Department of Civil & Materials Engineering
University of Illinois at Chicago

E-mail: kreddy@uic.edu

Phone: 312-996-4755

Course Description:

This course focuses on the characterization and risk assessment of contaminated sites and describes various technologies to remediate contaminated soils and groundwater.

Prerequisites:

Basic chemistry, physics and calculus

Text Book:

Sharma, H.D., and Reddy, K.R., "Geoenvironmental Engineering: Site Remediation, Waste Containment and Emerging Waste Management Technologies," John Wiley & Sons, Inc., 2004 (ISBN: 0-471-21599-6); See: <http://www.wiley.com/WileyCDA/WileyTitle/productCd-0471215996.html>

Syllabus:

I. Subsurface Contamination: Sources, Contaminants, Regulations and Remedial Approach

- Sources of Contamination
- Types of Contaminants
- Relevant Regulations
- Other Considerations
- Remediation Approach

II. Contaminated Site Characterization

- General Methodology
- Preliminary Site Assessment
- Exploratory Site Investigation
- Detailed Site Investigation
- Expedited or Accelerated Site Characterization

III. Risk Assessment and Remedial Strategy

- Risk Assessment Procedures
- USEPA Procedure
- ASTM Procedure
- Other Risk Assessment Methods
- Remedial Strategy

IV. In-Situ Waste Containment

- Vertical Barriers
- Bottom Barriers
- Surface Caps or Covers
- Groundwater Pumping Systems

- Subsurface Drains

V. Soil Remediation Technologies

- Soil Vapor Extraction
- Soil Washing
- Stabilization/Solidification
- Electrokinetic Remediation
- Thermal Desorption
- Vitrification
- Bioremediation
- Phytoremediation
- Soil Fracturing

VI. Groundwater Remediation Technologies

- Pump and Treat
 - In-Situ Flushing
 - Permeable Reactive Barriers
 - In-Situ Air Sparging
 - Monitored Natural Attenuation
 - Bioremediation
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