

# Contaminated Site Remediation

## 污染場址整治

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Class Time: Mon. 1610-1800, Wed. 1310-1400

Place: Rm. 47111

### Course Description

A broad range of knowledge relevant to contaminated site remediation is introduced in this course, including development of regulations, current status of contaminated sites, technologies used for site investigation and remediation, and risk assessment methods used in evaluation of contaminated sites. Besides lectures, two term projects, one for site characterization and one for site remediation, are required for all the students. In addition, a field trip to major contaminated sites is also included in the class.

### Course Schedule

1. Introduction and Background (1-1/2 week)
2. Regulations (1-1/2 week)
3. Risk Assessment (2 weeks)
4. Site Characterization and Monitoring (3 weeks)
  - Site Hydrogeology
  - Geophysics
  - Drilling Methods
  - In-Situ Testing
  - Monitoring Well
  - Sampling and Analysis
5. Midterm Seminars (1 week)
6. Environmental Forensic (1 week)
7. Treatment Technologies (5 weeks)
  - Critical Issues in Technology Selection
  - Containment Technologies
  - In-Situ* Remediation
    - Source Zone, Plume Zone, Distal Zone
    - Oil Recovery
    - Soil Vapor Extraction /Pump & Treat/Air Sparging
    - In-Situ Chemical Oxidation
    - Treatment Walls
    - Surfactant/Alcohol Flushing
    - Bioremediation/Phytoremediation
  - Natural Attenuation
8. Final Seminars (1 week)
9. Field Trip (1 week)

### References

1. LaGrega, M.D., Buckingham, P.L., Evans, J.C., The Environmental Resources Management Group (2001). *Hazardous Waste Management*, 2<sup>nd</sup> Ed., McGraw-Hill, Singapore. (Figures at <http://hazwastemanagement.info/home.html>, 2010)
2. Reports, standards, and articles from USEPA, ASTM, Journals and Conferences will be provided in class. (Please refer to internet sources)
3. 林財富等，土壤地下水污染整治：原理與應用，中華民國環境工程學會，2008。

### Grade:

Midterm Presentation	15 %
Midterm Report	15 %
Final Presentation	17.5%
Final Report	17.5%
Final Examination	35 %

Please link to <http://moodle.ncku.edu.tw/> to download class notes.