# SYLLABUS 2009
# Environmental Cleanup and Restoration
## CE/ESR 410/510

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**DATES**: July 20 - August 12, 2009
**TIME**: MTWR, 4:00 - 6:00 PM
**LOCATION:** Room 310 EB (Engineering Bldg, 1930 SW 4th Ave)
**CREDITS**: 4
**INSTRUCTOR**: William Fish, Ph.D, Assoc. Professor
**OFFICE**: EB 202E, 503-725-4278
**OFFICE HOURS**: 2:00-3:00 PM, T & W

Also available for Civil Engineering credit.

**COURSE SUBJECT:** This course is a survey of the current state-of-the-art in cleaning up and restoring contaminated environments. Emphasis will be placed on understanding the available techniques and on honing practical knowledge. The first part of the course will be dedicated to gaining the necessary background knowledge in basic environmental chemistry, risk assessment, and environmental law and regulation. Then we will apply this knowledge to real-world examples of contamination in three media: sediments, groundwater, and soil. Our goal is to learn the pros and cons of various cleanup techniques and critically examine what is deemed to be reliable and what is speculative in a given methodology. Practical knowledge will be developed in lectures and class exercises based on actual case studies, some to be drawn from Portland and the Pacific Northwest.

**COURSE FORMAT:** The course consists of four lecture and discussion periods per week. Students will be assigned readings to complete *before* each class. To keep everyone honest there will be a 3 - 5 min "Preparation Check" at the start of every class. This quiz will be simple but will be designed so that you must have at least read the assignment in order to pass the Prep Check. Grades will be based on Prep Check results, a midterm and a final exam, and on class participation.

| **GRADE BASIS:** | | |
|---|---|---|
| | Midterm Exam | 30% |
| | Final Exam | 30% |
| | Quiz (average score) | 30% |
| | Class Participation | 10% |

Class participation is a subjective evaluation by the teacher of your general preparedness for class and your willingness to participate in and contribute to group discussions.

## COURSE SCHEDULE:

| WEEK | DATE | TOPIC |
|---|---|---|
| 1 | M 7/20 | Overview of contamination problems; Contaminants of concern |
| | T 7/21 | Methods for analyzing contaminants; QA/QC |
| | W 7/22 | Risk Assessment; Dose-response and human exposure assessment |
| | R 7/23 | Risk Assessment Part 2 |
| 2 | M 7/27 | The rules we live by: Overview of environmental law and regulation |
| | T 7/28 | Contaminated Sediments: Overview of sediment ecology & contamination<br>Case Study 1: Columbia Slough, Portland. PCBs and human risk |
| | W 7/29 | Case Study 2: Foundry Cove, Hudson River, NY. Cd and dredging |
| | R 7/30 | Case Study 3: Eagle Point, Puget Sound, WA. Sediment capping |
| 3 | M 8/3 | MIDTERM EXAM; Introduction to soil and groundwater pollution |
| | T 8/4 | Soil & Groundwater Cleanup; Pump & treat and hydraulic control |
| | W 8/5 | Case Study 4: Chlorinated solvents at various sites: Sparging, soil-vapor extraction, reactive barriers, enhanced bioremediation |
| | R 8/6 | Case Study 5: Portland Harbor area Superfund Sites: McCormick & Baxter |
| 4 | M 8/10 | (TENTATIVE) FIELD TRIP: Tour of McCormick and Baxter cleanup site |
| | T 8/11 | Brownfields - Case Study 6: Portland Area Brownfields |
| | W 8/12 | FINAL EXAM |