

## EVEN 4830 Syllabus (DRAFT)

25 November 2007

Week	Date	Monday (3 to 5:50 pm)	Wednesday (4 to 5:50 pm)
1	1/14	<ul style="list-style-type: none"> <li>- Class introduction</li> <li>- Course outline</li> <li>- Site discovery to closure: how contamination occurs (industrial activity, emissions), investigation, risk evaluation, remediation, monitoring, site closure</li> <li>- Chemicals of concern: VOCs, SVOCs and PAHs, PCBs, metals</li> <li>- media of concern: soil, water, air; discuss mobility</li> </ul>	<ul style="list-style-type: none"> <li>- Site investigation</li> <li>- Phase I                             <ul style="list-style-type: none"> <li>o historical use, records, interviews</li> </ul> </li> <li>- Phase II investigations                             <ul style="list-style-type: none"> <li>o groundwater flow and contouring, transport basics</li> <li>o sampling (low flow, conventional sampling)</li> <li>o well installation, placement</li> <li>o sampling and analysis</li> </ul> </li> <li>- Field safety                             <ul style="list-style-type: none"> <li>o field hazards and ways to protect yourself</li> <li>o Health and Safety Plans</li> </ul> </li> </ul>
		<ul style="list-style-type: none"> <li>- Course syllabus</li> <li>- ASTM standards for Phase I and Phase II</li> <li>- Chemical cheat sheet</li> <li>- Writing guide</li> </ul>	<ul style="list-style-type: none"> <li>- Excerpt from Fetter's <i>Applied Hydrogeology</i></li> <li>- Groundwater well introduction</li> </ul>
2	1/21	<b>No Classes - MLK Holiday</b>	<ul style="list-style-type: none"> <li>- What is underground: geology and its significance</li> <li>- <u>Guest lecturer: In Situ - description of field equipment</u></li> </ul>
3	1/28	40-Hour Hazwoper Training with James Chandler of Condor Geotechnical Services, Inc.	40-Hour Hazwoper Training with James Chandler of Condor Geotechnical Services, Inc. (continued), including field dress out [wear closed toed shoes and pants]
		- Handouts from OSHA 40-hour HAZWOPER training	<b>* Homework for 40-Hour HAZWOPER training due</b>
4	2/4	Field day: mock aquifer logging, meet at East Campus [modified field attire required]	<ul style="list-style-type: none"> <li>- Debrief on logs</li> <li>- Monitoring well: installation, development, and cost</li> <li>- Groundwater disposal</li> <li>- <u>Guest lecturer: Kristen Carney Schultz of Faegre and Benson, LLP</u></li> </ul>
			<ul style="list-style-type: none"> <li>- Workplan organization</li> <li>- Well log</li> <li>- Water disposal categories</li> <li><b>* Site Health and Safety Plan due</b></li> </ul>
5	2/11	Field day: installation of 2-inch monitoring well, meet at East Campus [field attire required]	<ul style="list-style-type: none"> <li>- Groundwater contour maps</li> <li>- "Representative" groundwater sample</li> <li>- Groundwater sampling analyses</li> <li>- <u>Guest lecturer: analytical laboratory</u></li> </ul>
		<b>* Well installation proposal due</b>	<ul style="list-style-type: none"> <li>- List of laboratory analytical services</li> <li>- ASTM groundwater sampling</li> <li>- Chain of custody</li> <li>- Excerpt from Fetter's <i>Applied Hydrogeology</i> (slug test)</li> </ul>

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6	2/18	Field day: water gauging and sampling, meet at East Campus [modified field attire required]	- Debrief water gauging and sampling - Hydraulic conductivity and velocity - <u>Guest lecturer: Dan Reeder of Summit Technical Resources</u>
		* <b>Well Installation report due</b> * <b>Chain of Custody for groundwater sampling due</b>	- Field forms for troll lab and slug tests
7	2/25	Field day: troll lab, slug test; Guest: Dan Reeder of Summit Technical Resources	- Debrief troll lab - Soil sampling preparation
		* <b>Groundwater sampling report due</b>	- ASTM standards for soil sample collection - EnCore sampler instructions
8	3/3	Field day: soil borings, meet at East Campus [field attire required]	- Vapor intrusion from soil and groundwater
		* <b>Troll lab due</b>	- Vapor intrusion guidance
9	3/10	Field day: install and sample two soil vapor wells, meet at East Campus [field attire required]	- Debrief soil gas sampling - Site assessment: what to look for
		* <b>Soil sampling report due</b>	- ASTM Phase I guidance
10	3/17	Field day: site assessment (potentially EH&S building at CU)	- <u>Guest lecturer: CDPHE air quality site assessments</u>
		* <b>Risk assessment based on groundwater, soil, and soil gas sampling due</b>	
11	3/24	<b>Spring Break</b>	
12	3/31	- No field work today - Comparison of in or ex situ treatment methodologies o air sparge and soil vapor excavation o biological treatment o groundwater extraction and treatment o source excavation o natural attenuation	- Monitoring progress of treatment technologies - <u>Guest lecturer: Christy Woodward of Denison Mines</u>
		- Regulatory agency guidance documents on treatment technologies - Site Information	- Discharge limitations
13	4/7	- No field work today - Air sparge and soil vapor extraction system discussion - Installation and system design concepts	- Monitor progress of air sparge / soil vapor extraction - Costs - <u>Guest lecturer: water resources consulting firm</u>
		* <b>Technology Assessment due</b>	
14	4/14	Field day: air sparge / soil vapor extraction startup, meet at East Campus [field attire required] Guest: Terry Sprouse of Process Technology Support, LLC	- Debrief air sparge / soil vapor extraction pilot test
		* <b>Air Sparge Pilot Study Workplan due</b>	

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15	4/21	- No field work today - Expert witness laboratory  <b>* Draft Air Sparge Pilot Study Report due</b>	- <u>Guest lecturer: Trish Pfeiffer and Elaine Lai of EPA</u>
16	4/28	- Final Review	- Course survey questionnaires - Review for final  <b>* Final Air Sparge Pilot Study Report due</b>
17	5/5	<b>Week of Finals</b>	