ESH 450: Hazardous Waste and Industrial Pollution Control
Fall 2005

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Emergencies: home is 839-2733; cell is 653-7690

Office Hours: Tuesday and Thursday 10:00-11:30 am 106 Bailey Hall

Class: Tuesday 4:10-6:40 PM in 242 JMC

Text: LaGrega, M.D., Buckingham, P.L., and Evans, J.C. (2001): Hazardous Waste Management. New York: McGraw-Hill Companies, Inc.

Reference: On reserve at Gorham Library: Wang, L.K., Hung, Y.T., Lo, H.H. and C. Yapijackis. (2004): Handbook of Industrial and Hazardous Wastes Treatment. New York: Marcel Dekker, Inc.

Course description: This course explores the technical and regulatory requirements of the environmental permitting process, including air permitting, NPDES (National Pollutant Discharge Elimination System) permitting for wastewater, and hazardous waste permitting. Emphasis is on identifying and applying requirements for industrial ventures. Learning is achieved through a semester-long industrial case study.

Objectives of the course: at the completion of the course, the learner will be able to:

- Identify the air, NPDES and hazardous waste requirements for a new source (using Maine and EPA standards.)
- Outline/define the data needed to complete each type of permitting requirement
- Access and/or describe the data necessary to complete permit applications, and how to obtain it
- Draft a work plan for a comprehensive permit for a new industrial source

Work Plan: See next page

Work Plan

Tuesday September 6: Obtain "type of facility" assignment; brainstorm on facility matrix for description; receive "Terms Assignment A"

Tuesday September 13: Read Chapter 3: Process fundamentals, and Chapter 8: Facility Development and Operations; read and locate "Sector Program" for your industry (EPA website)
Read about your industry in Handbook of Industrial and Hazardous Waste Treatment
Definitions due (assignment)*
First pass at facility description due for class discussion*
Terms Assignment A due. Receive Terms Assignment S

Tuesday September 20: Read Chapter 7: Pollution Prevention, and Chapter 4: Fate and Transport of Contaminants
Facility Description due (handed in)*
Terms Assignment S due. Receive Terms Assignment P
First DEP Guest Speaker (about first half of class) on Air Permitting

Preparation: *Air Web Perusal*

- EPA
- DEP: Permits/Laws/Rules
    - Air Emission, Major sources

Tuesday September 27: Read Chapter 5: Toxicology
Terms Assignment P due. Receive Terms Assignment D
DEP guest speaker on Wastewater Permitting

Preparation: *Wastewater Discharge Web Perusal*

- EPA: effluent guidelines and NPDES
- DEP: Permits/Laws/Rules
    - Wastewater discharge

Tuesday October 4: In-class: workshop with industrial representatives/mentors
Terms Assignment D due; receive Terms Assignment E

Tuesday October 11: Fall Holiday (TGIF: thank God its Fall holiday…she's working us to death)

Tuesday October 18 or Tuesday October 25 : DEP guest speaker
Hazardous waste Web Perusal

- EPA's Website:
    - Look at Waste Treatment and Control
    - Look at Manifest System
    - Look at Commercial/Industrial
    - Look at Guide for Industrial Waste Management
- DEP: Permits/Laws/Rules
    - Hazardous Wastes

Other day: Dr. D. discusses State/Federal permitting requirements

Tuesday October 18:
Terms Assignment E due.
Receive Terms Assignment B.

Tuesday October 25: Terms Assignment B due. Receive Terms Assignment F

Tuesday November 1: Read Chapter 9: Physiochemical Processes and Chapter 12 Thermal Methods
Midterm evaluation of progress on air, water or solids requirements *
Terms Assignment F due. Receive Terms Assignment C.

Tuesday November 8: Read Chapter 10: Biological methods
Midterm evaluation of progress on air, water or solids requirements *
Terms Assignment C due; Receive Terms Assignment W

Tuesday November 15: Read Chapter 13 Land disposal and Chapter 11: Stabilization and Solidification
Midterm evaluation of progress on air, water or solids requirements *
Terms Assignment W due; Receive Terms Assignment H

Tuesday November 22: Individual library/literature work

Tuesday November 29: In-class workshop: where are you stuck relative to project completion
Terms Assignment H due.

Tuesday December 6: Five student presentations

Tuesday December 13: Four student presentations

EVALUATION: Total of 100 possible points:

"Terms Assignments: Crossword puzzles for the "Letter of the Week"
See EPA website: Educational resources, Teachers, Curriculum Resources, Dictionaries, Terms of Environment

Terms Assignments : 2 points times 10
- Sept. 13:A
- Sept. 20:S
- Sept. 27:P
- Oct. 4: D
- Oct. 18: E
- Oct. 25: B
- Nov. 1: F
- Nov. 8: C
- Nov. 15 W
- Nov. 29: H

Facility Description: 10 points
- 5 points for effort handed in with major components on 9/13
- 5 points for complete description handed in on 9/20

Selection and descriptions of three process units, one for each media (air, wastewater, waste): 15 points, on 10/26

Midterm evaluations on air, water, solids requirements for each of the three process units: 30 points
- 10 points each: 11/1; 11/8; 11/15 (Students pick order, one each week)

Final presentation: Tabbed notebook on project: 25 points

This course will not use plus or minus grading.

90-100 points = A
80-89 points = B
70-79 points =C
60-69 points =D
Below 60 points = F

All grades will be posted on Blackboard, along with any announcements or supplemental material. The Blackboard web site for this class may be found at http://www.courses.maine.edu.

ADA: Support for Students with Disabilities – Students who may need assistance due to a disability are encouraged to contact the Office of Support for Students with Disabilities, Luther Bonney 242. Phone: 780-4706, TTY: 780-4395.

Begin with the End in Mind
Final Project

I. Description of "Type of Facility"
   a. Narrative description
   b. Process flow diagram (comprehensive)
   c. Process units (3) that will be included in this project
      i. One releasing regulated air pollutants
      ii. One releasing treated wastewater
      iii. One hazardous waste storage unit and off site manifest of hazardous waste

Example: Oil refinery
- Size (acres and throughput)
- Raw materials/Projects
- Location
- Comprehensive flow diagram
- Process Units: function, flow diagram, and pollutants

II. For each of the three process units, one for each media (air, wastewater, waste)
   a. Descriptive narrative of each unit/media requirement
   b. Copies of applicable federal and state requirements
   c. Copies of applicable federal and state forms, completed

- Fluid catalytic cracking unit with an electrostatic precipitator and CO boiler (air)
- Wastewater treatment unit (likely series of steps that would meet NPDES requirements (water)
- Storage and disposal of API separator sludge (hazardous waste)

III. Flow diagram/Work plan to complete the permit application(s) for each of the three selected units