COURSE OUTLINE

CONS 485 – Solid Waste Management

Prepared By: Adrienne C. Rygel, Ph.D.
A. **TITLE:** Solid Waste Management

B. **COURSE NUMBER:** CONS 485

C. **CREDIT HOURS:** 3

D. **WRITING INTENSIVE COURSE:** No

E. **COURSE LENGTH:** 15 Weeks

F. **SEMESTER(S) OFFERED:** Spring

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
   Lecture: 3 hours

H. **CATALOG DESCRIPTION:**
   This course will introduce students to the governing, management, science, and engineering that impacts solid waste. The role of the federal government in the management of municipal solid waste is discussed, in conjunction with state solid waste legislation. Different types of solid waste streams (e.g. household waste, construction and demolition waste) and their characteristics will be examined. Students learn how to plan municipal solid waste management programs. A significant portion of the course will be spent on solid waste landfill engineering and design (e.g. liner systems, covers, leachate collection and treatment systems, groundwater flow and monitoring, gas migration and collection). Construction and operational principles of landfills are discussed. Opportunities for reduction, reuse, and recycling of solid waste are discussed as one solid waste management technique.

I. **PRE-REQUISITES:**
   CONS 385 (Hydrology and Hydrogeology) and CONS 216 (Soils and Foundations); or permission from the instructor

J. **GOALS (STUDENT LEARNING OUTCOMES):**
   By the end of this course, the student will be able to:

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<th>Course Objective</th>
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| 1. Conduct mass balance analyses of contaminant migration in landfills | 2. Critical Thinking  
3. Professional Competence |
| 2. Design landfill cover systems | 2. Critical Thinking  
3. Professional Competence |
| 3. Design landfill liner systems | 2. Critical Thinking  
3. Professional Competence |
| 4. Design leachate collection and treatment systems technology problem | 2. Critical Thinking  
3. Professional Competence |
| 5. Design landfill gas collection and recovery systems | 2. Critical Thinking  
3. Professional Competence |
| 6. Design groundwater monitoring systems | 1. Communication  
3. Professional Competence |
4. Inter/Intrapersonal Skills

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<th>4. Inter/ Intrapersonal Skills</th>
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<td>7. Prepare groundwater monitoring programs</td>
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<tr>
<td>1. Communication</td>
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<tr>
<td>2. Critical Thinking</td>
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<td>3. Professional Competence</td>
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<td>8. Interpret solid waste regulations</td>
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<tr>
<td>2. Critical Thinking</td>
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<td>3. Professional Competence</td>
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K. **TEXTS:**

L. **REFERENCES:**

M. **EQUIPMENT:**
None

N. **GRADING METHOD:**
A-F

O. **MEASUREMENT CRITERIA/METHODS:**
- Examinations,
- Homework assignments,
- In-class exercises,
- Quizzes

P. **DETAILED COURSE OUTLINE:**
I. Introduction
II. Regulations Related to Solid Waste Management
   A. Federal Regulations
   B. New York State Regulations
III. Composition of Solid Waste
IV. Site-Selection for Solid Waste Facilities
V. Principles of Decomposition in Landfills
VI. Mass Balance Computational Procedures in Landfill Assessment
VII. Water Balance Modeling For a Landfill
VIII. Landfill Design
   A. Covers
   B. Liner Systems and Barriers
   C. Leachate Collection and Treatment Systems
D. Landfill Gas Migration, Collection, and Recovery
E. Groundwater Monitoring Systems
F. Design for Natural Attenuation

IX. Landfill Construction and Operation
   A. Cell Construction and Operation
   B. Cover Materials and Frequency of Application
   C. Prevention of Precipitation Run-On
   D. Operational Control Considerations
   E. Site Life Span
   F. Site Operations and Control (e.g. odor, noise)

X. Monitoring Programs
   A. Groundwater monitoring and regulation requirements
   B. Leachate monitoring and regulation requirements
   C. Gas monitoring and regulation requirements

XI. Reduction Opportunities
   A. Reuse
   B. Recycling
   C. Composting