



Introduction to Solid Waste Management

Spring 2017

Lecturer: Dr. Jawad A.H Shoqeir

1.5 academic hours twice a week, 3 credits.

Overview:

In the twentieth century, due to industrial revolution and technology development, consumption patterns of the people, all over the globe, have changed. The use of natural resources and goods has increased manifold. Due to this, huge quantities of different types of solid wastes are produced every day, creating an alarming problem of their disposal. It is now recognized that proactive management is required to deal with this problem, i.e., it is required to reduce the generation of solid waste, effective collection of solid waste and utilization of solid waste rather than concentrating on disposal alone. Thus, solid waste management involves management of activities associated with generation, storage, collection, transfer and transport, reuse and recycling, processing and disposal which should be environmentally compatible, adopting to the principles of economy, aesthetics, and energy conservation.

Specific Goals

1. Waste Generation. The student should be able to identify the physical, chemical and biological characteristics of Municipal Solid Waste (MSW), including: density, energy and moisture characteristics.
2. Storage. The student should be able to calculate, storage requirement for MSW including; container size, truck size, available materials.
3. Collection. The student should be able to differentiate between variable collection systems.
4. Transfer and Transport. The student will be able to calculate the economics and design of transfer station including: preliminary design of the transfer station, truck movement, compaction and recycling.
5. Processing and Recovery. The student will become familiar with processing and recovery techniques: separation techniques, incineration and composting.
6. Disposal. The student should be able to integrate the previous steps into the design of a sanitary landfill including: waste disposal, cover materials, landfilling method, gas control and leachate control.

Course Requirements

The course will include one/two mandatory full-day field trips, worksheets, exercises, readings, etc. In addition to participating in class discussions and field trips, students will

have a midterm exam and a final exam. The main reading of this course will be provided by the instructor.

Grade components:

- Attendance, participation, discussions 15%
- Quizzes, Assignments, readings 25%
- Midterm exam 5%
- Field Trip and reports 15%
- Final exam 40%

Schedule

Lesson	Date	Topics
1.	22.2.2017	Introduction, Definition, Hierarchy of Waste Management
2.	23.2.2017	Evolution of Solid Waste Management, Legislative Trends and Impa <i>Readings: Pp 1.1 – 1.11</i> George Tchobanoglous, Frank Kreith: Handbook of Solid Waste Management, Second Edition, McGRAW-HILL: New York 2002.
3.	01.3.2017	- Sources, Composition, and Properties of Solid Waste - Physical, Chemical and Biological Properties of MSW Readings will be provided by the instructor.
4.	2.3.2017	Sources, Types and Properties of Household Hazardous Wastes
5.	8.3.2017	Disposal of Solid Wastes and Residual Matter <i>Readings will be provided by the instructor.</i>
6.	9.3.2017	Disposal of Solid Wastes and Residual Matter
7.	15.3.2017	Waste Handling and Separation, Storage and Processing at the Source <i>Readings will be provided by the instructor.</i>
8.	16.3.2017	Guest lecture by: Shmuel Bernner The integrated approach to waste treatment
9.	22.3.2017	Collection Routes, Management of Collection Systems. Readings: Pp 7.22 – 7.27 George Tchobanoglous, Frank Kreith: Handbook of Solid Waste Management, Second Edition, McGRAW-HILL: New York 2002.
10.	23.3.2017	Separation and Processing and Transformation of Solid Waste
11.	5.4.2017	Transfer and Transport
12.	6.4.2017	Solid Waste Generation and Collection Rates
13.	19.4.2017	From waste to Biogas Lab work
14.	20.4.2017	Principles of composting, hands on
15.	26.4.2017	Field trip to Nimra SW site
16.	3.5.2017	Composting of Municipal Solid Wastes I Readings: Pp 12.1 – 12.14 George Tchobanoglous, Frank Kreith: Handbook of Solid Waste Management, Second Edition, McGRAW-HILL: New York 2002.
17.	4.5.2017	Composting of Municipal Solid Wastes II Readings will be provided by the instructor.
18.	10.5.2017	From waste to Biogas data presentation
19.	11.5.2017	Overview of Recycling
20.	17.5.2017	Development and Implementation of Materials Recovery Facilities Readings: Pp 8.70 – 8.77 George Tchobanoglous, Frank Kreith: Handbook of Solid Waste Management, Second Edition, McGRAW-HILL: New York 2002.
21.	18.5.2016	Waste-to-Energy Combustion Introduction Readings: Pp 13.3 – 9.11 George Tchobanoglous, Frank Kreith: Handbook of Solid Waste

		<i>Management, Second Edition, McGRAW-HILL: New York 2002.</i>
22.	24.5.2017	Waste-to-Energy Combustion
23.	25.5.2017	Landfill Method design, location and Management
24.	1.6.2017	Landfill Method of Solid Waste Disposal
25.		Final exam

Text Book:

George Tchobanoglous, Frank Kreith: Handbook of Solid Waste Management, Second Edition, McGRAW-HILL: New York 2002.

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