

Fall 2018

ENE 660-101: Introduction to Solids and Hazardous Waste

H Hsieh

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JOHN A. REIF, JR. DEPARTMENT OF
**CIVIL AND ENVIRONMENTAL
 ENGINEERING**



EnE 660 - Introduction to Solids and Hazardous Waste Fall 2018
 Section: 101

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Text: "Solid Waste Engineering, A Global Perspective, 3rd Ed.", CENGAGE Learning, 2017, by William A. Worrell, P. Aarne Vesilind, and Christian Ludwig. ISBN-13: 978-1-305-63520-3, ISBN-10: 1-305-63520-5.

Introduction to solid waste management, which includes waste collection, recycling, composting, energy recovery, and landfilling. Federal and state regulations, and application of engineering principles related to these topics are introduced.

WEEK	TOPIC	TEXT	HOMEWORK
1	Introduction – Integrated Solid Waste Management	1	
2	Municipal Solid Waste Characteristics and Quantities	2	2 - 9 (assume 4 lb/capita/day, loose waste density = 200 lb/yd ³ , compacted waste density = 750 lb/yd ³), 13, 14, 15
3	Hazardous wastes	RCRA Orientation Manual	2 – 17, 18
4 - 5	Waste collection and transfer stations	3	3 – 1 (0.59 yd ³ generation/location, waste density 250 lb/yd ³), 8, 18, 20, 21
6	Mechanical processes	4	4 – 1 (Wood chip SG = 0.7, bulk density = 18.5 lb/yd ³), 6 (coeff. of friction = 0.4), 10, 16 (E _i = 400 kWh/ton)
7	Mid-term		
8	Separation processes	5	5 – 1 (waste generation 4 lb/d, sorting 1000 lb/hr/person, wage \$10/hr), 2, 4, 5, 12, 14, 23

9	Biological processes	6	6 – 1, 3 (= g methane/g refuse), 6, 8
10	Thermal processes	7	7 – 10, 12
11 - 12	Landfills	8	8 – 2, 3, 5 (assume methane generation 1110 m ³ /ton, gas emission constant: 0.0307/yr), 9
13	Toward Integrated Resources Management – Environmental, Political and Economic Issues	9	9 – 6, 9
14	Term paper presentation		
15	Final exam.		

Grade Policy:

Homework	20%
Mid-Term Exam.	35%
Final Exam.	35%
Term Paper	10%

1. Homework problems are to be solved and turned in the week following the assignment. Team paper presentation (PowerPoint) are due on 14th week. If you submit your homework in digital form, please use your last name and homework number as the file name, for example, smith_HW1.
2. Term paper can be case study, comparison study, or any topic related to solid waste collection, modeling, disposal, recycling, treatment, and management. The length of the paper is approximately 10 pages with references.

Solid Waste References:

1. RCRA Orientation Manual 2014: <https://www.epa.gov/hwgenerators/resource-conservation-and-recovery-act-rcra-orientation-manual>
2. The RCRA regulations: <https://www.epa.gov/rcra>
3. NJ Solid and Hazardous Waste regulation: <http://www.nj.gov/dep/dshw/resource/rules.htm>.
4. USEPA – Office of Solid Waste: <http://www.epa.gov/osw/> . Overview of all aspects of solid waste management,
5. NJDEP Division of Solid and Hazardous Waste: <http://www.nj.gov/dep/dshw/>. Permitting, regulations, management plan,
6. Waste360 (Waste Age), <http://waste360.com/>. News, buyer’s guide, product information, etc.
7. Solidwaste.com: www.solidwaste.com. News, buyer guide, product showcase, market research reports.
8. International solid waste association: <http://www.iswa.org/> . News, information, and various publications.

*The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students.

*Students will be consulted with by the instructor and must agree to any modifications or deviations from the syllabus throughout the course of the semester.