

ENHL221 (3 cr.): Management of Domestic and Hazardous Waste

Course Instructor: *Dr. May Massoud*

Office: Van Dyck, room 415

Office Hours: Tuesday and Thursday: 10:00-12:00 or by appointment

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Location and Time: Van Dyck, room 203; Tuesday and Thursday: 8:00 – 9:15 am

CATALOGUE COURSE DESCRIPTION

ENHL 221 (3 crs.): A course that introduces the elements of solid waste management: sources, characterization, generation rates, collection, transportation, and disposal technologies. Concepts are presented within the context of integrated management: reduction, reclamation, recycling, and disposal. Socioeconomic implications at the community and national levels are emphasized.



LEARNING OBJECTIVES (LOs)

- LO1. Discuss the spatial aspect of waste production, handling, processing and disposal.
- LO2. Identify sources, quantities generated, composition, and properties of solid and hazardous wastes.
- LO3. Identify waste disposal and transformation techniques.
- LO4. Explain ecological, land use and social impacts of landfilling, composting, incineration and recycling.
- LO5. Discuss the health effects of domestic and hazardous waste management.
- LO6. Evaluate the relative risks associated with management alternatives.
- LO7. Recognize the relevant regulations that apply for facilities used for treatment and disposal of solid waste.
- LO8. Explain the changes needed to develop a sustainable and integrated solid waste management system.

COURSE RESOURCES

There is no required textbook for this course. Lecture handouts will be available on the **course Moodle**.

Reference Online Books

The books below can be accessed online via AUB Homepage, Libraries, [Ebrary Academic Complete](#). Supplementary sources are available on the LIBCAT.

Ramesha, C. and Bhusan Das, D. Solid Waste Management Principles and Practice. Berlin; New York: Springer, 2012.

Tchobanoglous, G., Theisen, H. and Vigil, S. Integrated Solid Waste Management. New York: McGraw Hill, 1993.

Hester, R. E. and Harisson, R. M. Environmental and Health Impact of Solid Waste Management Activities. The royal Society of Chemistry, Cambridge: UK, 2002.

Articles (related to solid waste management in Lebanon)

1. **Massoud, M.A.,** Mokbel, M. Alawieh, S. (2019) Reframing Environmental Problems: Lessons from the Solid Waste Crisis in Lebanon. *Journal of Material Cycles and Waste Management*, 21(6), pp. 1311-1320. DOI 10.1007/s10163-019-00884-8
2. **Massoud, M.A.,** Mokbel, M. Alawieh, S. and Yassin, N. (2019) Towards Improved Governance for Sustainable Solid Waste Management in Lebanon: Centralized Vs Decentralized Approaches. *Waste Management & Research Journal*, 37(7), pp. 686-697. <https://doi.org/10.1177/0734242X19836705>.
3. **Massoud, M.,** El-Fadel, M., and Abdel, Malak, A. (2003). Assessment of public vs. private MSW management: A case study, *Journal of Environmental Management*, **69**, pp. 15-24.
4. **Massoud, M.** and El-Fadel, M. (2002). Public-Private partnerships for solid waste management services, *Environmental Management*, **30**(5), pp. 621-630.

You might want to check out scholarly journals for current information. Access to some journals can be attained electronically. ([AUB Homepage](#), [Libraries](#), [Current Journals](#), [Select a Discipline](#), [Environmental Science](#))

ASSESSMENT OF STUDENT PERFORMANCE

Table 1. Assessment methods mapped to course Learning Objectives

Mode of Assessment of Students	Learning Objectives							
	LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8
2 Quizzes (each 5%)	X	X	X					
First Exam (35%)	X	X	X	X				
2 Quizzes (each 5%)					X	X	X	
Final Exam (35%)				X	X	X	X	X
Class Participation and Attendance (10%)				X				X

Exams may include multiple choice, true/false, short answer questions, problems and/or case studies. Calculators are allowed during examinations, but sharing calculators is not allowed.

COURSE POLICIES

Attendance

Attendance in this course follows University regulations. For more information, kindly refer to AUB Catalogue.

Class participation

Learning is an interactive process. Participation in class whether by asking questions when you don't understand or by giving your opinion when it is appropriate is essential for learning.

Team work

Working in a team is of great importance among multidisciplinary professionals. It requires communication and interpersonal skills, good coordination and project management. You should always do your share in partner or group work.

Assignments

You are expected to submit assignments on time. Late assignments will be penalized by a reduction in grade and should be submitted the following session. You should have a valid reason as determined by the instructor for not submitting the assignment on time.

Exams and Quizzes

You are expected to take exams on scheduled time. Failure to take a scheduled exam will result in a zero. Make-up exams may be given to students who provide a valid reason and supporting documentation as determined by the instructor. The instructor reserves the right to change the format and increase the level of difficulty on any make-up exam. Make-up exams must be scheduled within one week of the original examination date. There is **no** makeup for quizzes.

Withdrawal

The last day for a student to withdraw from this course is **Thursday April 9, 2020**. Any student with an average grade below 60, by that date, is recommended to consult with his/her academic and registration advisor and may consider withdrawing from the course.

Code of Conduct

The faculty expects from its students a high level of responsibility and honesty. You are expected to abide by the following honor code in all work associated with this course. While you are encouraged to discuss the course topics with faculty members and with other students, submitted reports must be unequivocally your own work. Where material is taken from other sources, the work in question must be clearly acknowledged in your report or your presentation. Otherwise, your action constitutes plagiarism. The course instructor takes a serious view of both plagiarism and collusion and imposes serious penalties for these offences which can vary from failing the course to disciplinary procedures at University level.

Please review all rules and regulations set forth in the current edition of the Student Code of Conduct (AUB home page, www.aub.edu.lb; policies and procedures; [Student Handbook](#)).

Class Conduct

Be Punctual: Class will start on scheduled time. If you must arrive late or leave early, let me know in advance.

Kindly avoid activities that are disruptive to the learning environment in the classroom.

You are expected to be respectful of other peers and the instructor at all times. Appropriate measures will be taken against disrespectful students in due time.

For more information please review all rules and regulations set forth in the current edition of the Student Code of Conduct (AUB home page, www.aub.edu.lb; policies and procedures; [Student Handbook](#)).

Course Evaluation

At the end of the semester you will be asked to fill a course evaluation form. Your objective opinion is highly solicited to get accurate data.

Students' Comments about Course Policies and Procedures

I welcome and encourage students' comments concerning any aspect of this course. It is recommended to submit your comments first in writing and discuss them with me outside of class time.

STUDENTS WITH SPECIAL NEEDS

AUB strives to make learning experiences accessible for all. If you anticipate or experience academic barriers due to a disability (such as ADHD, learning difficulties, mental health conditions, chronic or temporary medical conditions), please do not hesitate to inform the Accessible Education Office. In order to ensure that you receive the support you need and to facilitate a smooth accommodations process, you must register with the Accessible Education Office (AEO) as soon as possible: accessibility@aub.edu.lb; +961-1-350000, x3246; West Hall, 314.

NON-DISCRIMINATION – Title IX – AUB

AUB is committed to facilitating a campus free of all forms of discrimination including sex/gender-based harassment prohibited by Title IX. The University's non-discrimination policy applies to, and protects, all students, faculty, and staff. If you think you have experienced discrimination or harassment, including sexual misconduct, we encourage you to tell someone promptly. If you speak to a faculty or staff member about an issue such as harassment, sexual violence, or discrimination, the information will be kept as private as possible, however, faculty and designated staff are required to bring it to the attention of the University's Title IX Coordinator. Faculty can refer you to fully confidential resources, and you can find information and contacts at www.aub.edu.lb/titleix. To report an incident, contact the University's Title IX Coordinator Trudi Hodges at 01-350000 ext. 2514, or titleix@aub.edu.lb. An anonymous report may be submitted online via EthicsPoint at www.aub.ethicspoint.com.

DETAILED COURSE OUTLINE*

Date	Topic	Course Objectives
Jan. 23	Course content and requirements	
Jan. 28	Evolution of solid waste management	1
Jan. 30	Sources, composition, and properties of solid waste	1-2
Feb. 04	Physical, chemical and biological properties of municipal solid waste	3
Feb. 06	Sources, types and properties of hazardous waste	2, 5
Feb. 11	Problem solving session	1-3
Feb. 13	Solid waste generation and collection rates	2
Feb. 18	Waste handling and separation, storage and processing at the source	4-6
Feb. 20	Collection of solid waste	4-6
Feb. 25	Separation and processing and transformation of solid waste	3-6
Feb. 27	Separation and processing and transformation of solid waste: Thermal conversion techniques	3-6, 8

* The following is a general outline of material to be covered during the semester.

Note: the schedule is subject to changes in response to progress and opportunities that may arise in a given semester. Any changes to the schedule will be announced in class.

Mar. 03	Separation and processing and transformation of solid waste: Biological and chemical conversion techniques	3-6, 8
Mar. 05	Problem solving session	3-6
Mar. 10	Transfer and transport/ Disposal of solid waste	3-6
Mar. 12	The landfill method of solid waste disposal; Composition and characteristics, generation, movement and control of landfill gas	3-6
Mar. 17	Problem solving session	4-6
Mar. 19	Exam I	1-6
Mar. 24	Exam correction	
Mar. 26	Composition, formation, movement, and control of leachate in landfills Environmental quality monitoring at landfills/ Materials separation and processing technologies	3-6
Apr. 02	Case Study	3-6
Apr. 07	Hazardous Waste Management	4-8
Apr. 09	Hazardous Waste Management at AUB	
Apr. 14	Health Care Waste Management	4-8
Apr. 16	Reduce, reuse, recycle: the zero waste approach	7
Apr. 21	Integrated solid waste management	7-8
Apr. 23	Case Study	7-8
Apr. 28	Quiz/problems solving	
Apr. 30	Revision	

Enjoy the course!