The University of Jordan
School of Engineering
Chemical Engineering Department

**Program:** B.Sc.
**Academic Year:** ( / )
**Semester:** Semester

- **CHE0905574: Hazardous Waste Management**

- **Course Catalog (2024)**

Hazardous wastes regulatory framework and international conventions. Hazardous waste sources, properties and classification, storage, transport, fate and transport of contaminants. Hazardous waste minimization and pollution prevention options. Hazardous waste treatment technologies and remediation processes, as well as, safe disposal of hazardous waste. Management of non-conventional hazardous wastes (medical waste, etc).

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| **Credit hours** | **3** | **Level** | | **Pre-requisite(s)** | **0915471** |
| **Instructor**<br>**Dr. Motasem Saidan** | | **Office number**<br>**CHE303** | | **Office phone**<br><br>Ext. 22893 | |
| **Course website**<br>https://elearning.ju.edu.jo/login/index.php | | **E-mail**<br>**m.saidan@ju.edu.jo** | | **Place**<br>Refer to Registration website | |

- **Textbook:**

1. William Worrell & P. Aarne Vesilind, Solid Waste Engineering, 2012.
2. George Tchobanoglous, Handbook of Solid Waste Management, 2002
3. Instructor Handouts.

- **References:**

1. Davis, M.L. and Cornwell, D.A**.** "Introduction to Environmental Engineering", McGraw-Hill, N.Y., 4th edition or later.

- **Learning Objectives and Intended Learning Outcomes**

| Objectives | Outcomes |
|---|---|
| 1. Gaining knowledge in solid waste concepts, definitions, and components | 1.1 Know the basic knowledge of waste definitions, materials and waste flow in society and industrial systems **O3, O7**<br>1.2 Define, identify, classify, and characterize the solid waste **O1** |
| 2. Basic understanding of integrated solid waste management. | 2.1 Understand the basic principles of waste generation, collection, movement and transfer, and disposal **O2**<br>2.2 know the basic waste minimization practices: 4Rs,..etc **O4** |
| 3. Fundamental understanding of landfill design | 3.1 Demonstrate ability to design and propose a landfill based on population growth rate and waste generation rate **O2,**<br>3.2 Understand the key biochemical transformations of solid waste **O2** |
| 4. Model developing of biogas potential production from the landfill | 4.1 Demonstrate ability to build mathematical model to estimate the feasibility of LFG potential for direct-use or electricity generation in the landfill **O1, O2** |
| 5. Develop the skills needed to successfully | 5.1 apply knowledge from general science and engineering courses to |

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| design waste collection and collection routing. | propose efficient collection trips and routing **O7** |
| 6. Become familiar with the regulatory and institutional framework concerning waste management and policy | 6.1 gain insight to the socio-economic assessment of the local waste management system and policy **O3**<br>6.2 Communicate with the local communities by interviewing and questionnaire gathering **O3** |

## ▪ Topics Covered

| Lectures | Topics | Reference |
|---|---|---|
| 1 | Introduction & Syllabus | Handouts, Textbook |
| 3 | Solid waste definition, concepts, and characterizations | Handouts, Textbook, |
| 5 | Solid waste chemical, physical, and biological characterization | Handouts, Textbook, |
| 3 | Solid waste generation and quantities | Handouts, Textbook, |
| 4 | Solid waste collection and routings | Handouts, Textbook, |
| 7 | Landfills: General, planning, siting, and processes | Handouts, Textbook, |
| 4 | Socio-economic assessment of SWM systems in Jordan: Questionnaire designing and data gathering, assessment, and reporting | |
| 4 | Landfills: Leachate quantity | Handouts, |
| 5 | Landfills: LFG and biogas potential productions; mathematical modeling | Handouts, Textbook, |
| 4 | Waste Biochemical processes: aerobic, anaerobic, and composting | Handouts, Textbook, |
| 5 | Landfill Design | Handouts, Textbook |

## ▪ Evaluation

| Evaluation Tool | Weight | Date |
|---|---|---|
| **Midterm Exam** | 30 | Will be announced by the department |
| **Projects, Case studies, activities** | 30 | Will be arranged between the 5$^{th}$ and 16$^{th}$ weeks |
| **Final Exam** | 40 | Will be announced by the University |

## ▪ Intended Scale

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|---|---|---|---|---|---|---|---|---|---|---|---|
| F | D- | D | D+ | C- | C | C+ | B- | B | B+ | A- | A |

## ▪ Relationship to Program Outcomes (%)

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|---|---|---|---|---|---|---|---|---|---|---|
| O1 | O2 | O3 | O4 | O7 | | | | | | |
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## ▪ Relationship to CHE Program Objectives

| PEO1 | PEO2 | PEO3 | PEO4 | PEO5 | PEO6 | PEO7 | PEO8 | PEO9 | PEO10 | PEO11 |
|---|---|---|---|---|---|---|---|---|---|---|
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## ▪ Document Control

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|---|---|
| Prepared by | Dr. Motasem Saidan |
| Last Modified | 23.09.2025 |
| Current Version | 23.09.2025 |