ABET-Course Syllabus

Course number and name: Energy Conservation and Management (0905483)

1. **Prerequisites:** (0905343)
2. **Class schedule: 3 Credits Hours**
   - **a. Time and place**: ……
   - **b. Office hours**:……..
1. **Instructor:** ……..
   Office Tel. number: …….
   Email: ……
2. **Textbook:**
   1. Culp, Jr, A W., Principles of energy conversion, second edition. United States: N. p., 1991.
   2. Charles M. Gottschalk: Industrial Energy Conservation, UNESCO Energy Engineering Series, John Wiley & Sons Ltd., Chichester, West Suss
   3. Power point slides provided by instructor.

3. **References:**

1. Eastop, T.D., and Croft, D.R., 'Energy efficiency for engineers and Technologists', Longman Group UK, 1990.
2. Kennedy, W.J., Turner, W.C., and Capehart, B.L., 'Guide to Energy Management', Fairmont Press, 1994.
3. Wulfinghoff, D.R.,'Energy Efficiency Manual' Energy Institute Press, 2003.
4. Yaşar Demirel, Production, Conversion, Storage, Conservation, and Coupling, 2nd edition, Springer International Publishing Switzerland, 2016
5. Giovanni Petrecca, Energy Conversion and Management Principles and Applications

4. **Course website**: https://elearning.ju.edu.jo//

5. **Online lectures:** When needed, online lectures are given using Zoom

6. **Catalog description::**

Review of energy sources and their applications. Energy auditing. Energy conservation in industrial and commercial sectors. Choice of fuel. Waste heat recovery systems. Energy economics and economic use of electricity. Process integration for efficient use of electricity. Process integration for efficient use of energy including energy cogeneration, selection of heat transfer equipment and enhancement of heat transfer.

7. **Specific goals of the course:**

After this course students should be able to:	Chemical Engineering program outcomes:						
	O1	O2	O3	O4	O5	O6	O7
1. Understand basics of demand side management and mechanisms.							
2. Recognizing opportunities for increasing rational use of energy.							
3. Understand the basics of energy auditing with application on different sectors.							
4. Understand the Energy transformations technologies including renewable energy							
5. Understanding the concept of sustainable development							
6. Apply economic and financial evaluation of energy projects							
7. Understanding how to improved energy efficiency in industry, building sector, transport. Basics of energy system planning, energy policy, energy markets, energy sector restructuring.							

8. **Course topics:** Course topics will be covered through around 45 (60 minutes) classes according to the following distribution:

Content	# of lectures
1. Introduction, course outline, and definitions Energy sources, reserves and consumption Energy demand and supply	3
2. Pattern of energy used in domestic, agricultural and industrial production, commercial and service sectors	3
3. Energy auditing	3
4. Economy and financial evaluation of energy projects	3
5. Efficient energy conversion processes & Selection of energy equipment	6
6. Process integration for efficient use of energy and Pinch technology	6
7. Energy recovery systems & Enhancement of heat transfer	6
8. Energy management methods, Identification, evaluation and implementation of energy conservation measures	3
9. Energy in Building s & lighting	3
10. Sustainable development of energy,	3
11. Waste heat recovery systems	6
12. Renewable energy: sources, status and economic aspects	3

9. **Policies and procedures:**

Attendance. Students are expected to attend each class session and they are responsible for all material, announcements, and schedule changes discussed in class. University policy states that teachers must keep a record of attendance throughout the semester and may impose academic penalties commensurate with the importance of the work missed because of unexcused absences.

Lateness. Coming late to class is disruptive and may be treated as an unexcused absence.

Grading policy. A weighted average grade will be calculated as follows:

- Midterm exam 30%
- Project: 20%
- Final exam: 50%

10. Contribution of Course to Meeting the Professional Component:

This course contributes to building the fundamental and design concepts in separation processes.

11. Relationship to Program Outcomes (%):

O1	O2	O3	O4	O5	O6	O7
√	√					

12. Relationship to Chemical Engineering Program Objectives:

PEO1	PEO2	PEO3	PEO 4
√	√	√	√

13. ABET Criteria: Outcomes and Assessment: Engineering programs must demonstrate that their graduates have

- O1 Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- O2 Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- O3 Communicate effectively with a range of audiences.
- O4 Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- O5 Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- O6 Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- O7 Acquire and apply new knowledge as needed, using appropriate learning strategies.

Prepared by: ……
Last Modified: September, 2021