



University of Jordan
School of Engineering
Chemical Engineering Department

1. **Course number and name:** (0905451) Local Chemical Industries
2. **Class schedule:** 3 credit hours
Time and place: Sun., Tue: 11:00-11:50 at Taher Hall, CHE
Lab work: To be arranged with Eng. Arwa Sandouqa (ChE Labs)
3. **Instructor:** Dr. Linda Al-Hmoud
Office: CHE 305
Email address: l.alhmoud@ju.edu.jo, linda.ju14@gmail.com
Office hours: Sun, Tue 10:00 – 11:00 am, Mon, Wed 12:00-1:00 pm
4. **Text book:** Austin, G.T.; *Shreve's Chemical Process Industries*, 5th Ed., McGraw Hill
5. **References:** Kirk-Othmer Encyclopedia of Chemical Technology - Wiley Online Library
6. **Website:** <http://academic.ju.edu.jo/l.alhmoud>
Course **e-learning** portal (<https://elearning.ju.edu.jo/>)
7. **Course Information: Prerequisite:** (0905442) *Heat and Mass Transfer Operations*
Studying the basic principles, raw materials and process description for a number of industries such as, industrial gases, inorganic acids, sodium, potassium and phosphates industries. Cement; Ceramic; Glass; Oil and Fat; Soap and Detergents; Surface coating industries; Specifications and Standards. Local Regulations.
8. **Course Objectives:**
 1. Provide general idea about major chemical industries and focus on the locally available ones.
 2. Integrate the application of chemical engineering principles, unit operations and process in real industries.
 3. Describe the operation of water conditioning and introduce examples of new sources of energy.
 4. Cover operation of selected industries from raw material to final product (ceramics, paints, cements, detergents).
 5. Encourage innovation and lifelong learning, and enhance communication skills.
9. **Course Outcomes:** By the end of the course, a student should be able to:
 1. Discuss meaning and necessity of water conditioning for removal of impurities in fresh water. (O7)
 2. Recognize meaning of hardness and explain different methods of water softening and conditioning. (O7)
 3. Recognize importance and need for energy and identify different sources and classes of energy. (O7)
 4. Distinguish between renewable and nonrenewable sources of energy and identify existing solid, liquid and gaseous fuels. (O7)
 5. Describe existing nonconventional sources of energy such as solar energy, geothermal energy and fuel cells. (O7)
 6. Identify main raw materials, reactions, and processing steps involved in traditional ceramic production. (O7)
 7. Describe the variety of ceramic products and relate them to the differences in processing steps, and recognize new trends in modern composite materials. (O7)
 8. Describe cement manufacturing processes including its raw materials, additives, recipe, and reactions, and distinguish between clinker, cement, and concrete. (O7)

9. Identify major sources of cement raw materials, types of cements, and relate compounds of clinker to their role in strength development in cement and concrete. (O7)
10. Identify different types and classifications of paints and surface coatings. (O7)
11. Recognize constituents of paints, their diversity and functions, and identify ways of imparting desired properties by variation of constituents and additives. (O7)
12. Describe process and flow sheet for manufacturing surface coatings, and identify different mechanisms of paint curing or drying. (O7)
13. Recognize constituents of soaps, detergents, and surfactants, their diversity and functions, and describe process and flow sheet for their manufacturing. (O7)
14. Write technical report and develop proposal according to technical writing standards. (O3)
15. Discuss, employ and cite technical papers; and write a comprehensive technical report. (O3)
16. Develop chemical products of market interest by working in teams and performing lab scale research, and use their collected data to present them orally or on a poster. (O3, O5, O7)

10. Topics covered:

Content	Text book	Week
1. Technical writing		1
2. Water Conditioning	Chapter 3	2 – 3
3. Energy and Fuels,	Chapter 4	4 – 5
4. Ceramic Industries	Chapter 9	6 – 7
5. Cements	Chapter 10	8 – 9
6. Surface coating and paints	Chapter 24	10 – 11
7. Soaps and Detergents	Chapter 29	13 – 14

11. Practical Project:

Practical project is to be applied during the practical session. Groups of 5-6 students should select a certain industry and provide a product demonstration, report and presenting it in a poster session during the 12th week.

12. Assessment & Grading:

Quizzes and Classwork	:	10%
Practical Project	:	20%
Midterm Exam	:	30%
<u>Final exam</u>	:	<u>40%</u>
Total	:	100%

13. Relationship to Program Outcomes

O1	O2	O3	O4	O5	O6	O7
		✓		✓		✓

14. Relationship to Chemical Engineering Program Educational Objectives

PEO1	PEO2	PEO3	PEO 4
✓	✓	✓	

15. Class Announcements

Announcements related to this course are uploaded to the course e-learning portal.