The University of Jordan

School of Engineering

Chemical Engineering Department

1. **SEMESTER:** First semester 2025 - 2026

2. **COURSE INFORMATION**
   - Code and Name: **0915481 - Chemical Process Technology**
   - Perquisites: (2019 plan) 0915451 – Separation Processes (1); (2024 plan) Passing 99 credits
   - Credit Hours: 2
   - Class Meeting: Sun/Tue 11:30-12:50

3. **INSTRUCTOR**
   - **Dr. Hatem Alsyouri**
   - **Office location**: CHE Department
   - **Email address**: alsyouri@ju.edu.jo
   - **Office hours**: Sun/Tue/Thu 9:30 – 10:30, Mon/Wed 2:00-3:00

4. **COURSE DESCRIPTION**

   Fundamentals of chemical industries; study of selected industrial processes such as Dead Sea chemical industries (potash and bromine), cement production, inorganic ceramics, and paint manufacturing.

5. **TEXTBOOK**

   Teaching materials are compiled from multiple sources and will be shared through the course's E-learning platform.

   References

   1. Austin, G. T. Shreve's Chemical Process Industries, 5th ed., McGraw-Hill, 1984.
   2. Kirk-Othmer Encyclopedia of Chemical Technology, Wiley Online Library.
   3. Selected peer-reviewed journal articles.
   4. Relevant industrial websites and technical resources.
   5. Educational and industrial videos of chemical processes

6. **WEBSITE**
   - **E -learning account** (https://elearning.ju.edu.jo/)
   - https://eacademic.ju.edu.jo/Alsyouri/default.aspx

7. **COURSE LEARNING OUTCOMES (LOs)**

   Upon successful completion of the course, the student should be able to:

   1. Describe the production of potash from Dead Sea raw materials by explaining the hot leach process and the cold crystallization process, including major raw materials, process steps, and products. (SO7)
   2. Explain the bromine extraction process that uses potash plant brines as feedstock, identifying key reactions, separation steps, and the significance of process integration between the potash and bromine industries. (SO7)
   3. Describe the main stages of cement manufacturing, including raw materials, additives, clinker formation, and product differentiation between clinker, cement, and concrete, and identify major types of cement and key terminology used in the cement industry. (SO7)
   4. Explain the processing steps, materials, and reactions used in traditional and modern ceramic production, and relate them to the physical properties of the final products. (SO7)
   5. Recognize the types, constituents, and functions of paints and surface coatings, and relate formulation variations to performance and industrial applications. (SO7)

6. Interpret and discuss process flow diagrams (PFDs) and flow sheets of selected chemical industries, identifying input–output relationships and key unit operations. (SO7)
7. Assess the application of modern trends such as sustainability practices, environmental protection, and the integration of artificial intelligence (AI) in process design and optimization. (SO7)
8. Prepare and communicate technical information effectively by writing proposals and technical reports, and by presenting results verbally and through posters, following professional engineering communication standards. (SO3)
9. Work effectively in teams to research, evaluate, and present industrial chemical processes, demonstrating collaboration, shared responsibility, and professional communication. (SO5, SO3)

Related Chemical Engineering Program Student Outcomes (SOs) - ABET

SO3. An ability to communicate effectively with a range of audiences.
SO5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

8. COURSE TOPICS

Topic	# of Weeks
Technical writing	1
Potash industry	2
Cement manufacturing	3
Bromine industries	2
Ceramic industries	3
Paint and Surface coating manufacturing.	1

9. PRACTICAL PROJECT

- The practical project is one of the required assessments and will be carried out in groups of five (5) students.
- Each group will select a chemical industrial topic, identify a specific challenge, and propose practical or simulated solutions that add value to the process or product.
- Related experiments may be conducted in university laboratories or industrial sites, provided that all safety procedures and regulations are strictly followed.
- Students will report their outcomes using appropriate communication methods and present their results in a poster session with Q&A discussions during Week 13.

10. ASSESSMENT & GRADING

Assessment	*Weight*
Project	20%
Midterm	30%
Final exam	50%
Total	**100%**

11. POLICIES AND EXPECTATIONS

a. **Attendance:** Students must attend all classes and are responsible for any material or announcements made. The university attendance policy will be strictly followed.
b. **Classroom conduct in:** Phones and laptops must be turned off unless used for instructional purposes. Professional and respectful behavior is expected at all times.
c. **Academic Integrity:** All forms of academic dishonesty will be handled according to university regulations.
d. **Instructional methods:** Lectures, class discussions, and in-class problem solving.
e. **Announcements**: Announcements related to this course are uploaded to the course e-learning portal.
f. **Software:** Use of Excel and Aspen HYSYS is encouraged for calculations, process simulation, data analysis, and graphical presentation.
g. **Assignments**: Assignments must be submitted on time; late work is not accepted. The course includes a practical project, a midterm exam, and a comprehensive final exam. The exams are designed to evaluate students' understanding and application of topics learned in classes.
h. **Safety Operations:** If a project involves research in university labs or industrial sites, students must strictly adhere to all safety regulations, follow the safest possible procedures, and avoid the use of hazardous or dangerous materials whenever feasible.

12. RELATIONSHIP TO PROGRAM STUDENT OUTCOMES (SOs)

SO1	SO2	SO3	SO4	SO5	SO6	SO7
		✓		✓		✓

13. RELATIONSHIP TO CHEMICAL ENGINEERING PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1	PEO2	PEO3	PEO 4
✓	✓	✓	

Note: The instructor has the right to amend the content of this syllabus and keep students informed about the updates.

Revised on: 06-11-2025
V2