



ABET-Course Syllabus

- Course number and name: (0905211) Chemical Engineering Principles 1**
- Class schedule: 3 Credits Hours**
 - Time and place:** Section 1: Mon. and Wed. 08:30-09:30 at Hall 101
Lab.: Sun. 14:00-17:00 at Hall 101
 - Office hours:** Sun. and Mon.: 12:00 – 13:00
- Instructor:** Prof. Mohammad Al-Shannag
Office Tel. number: 5355000, Ext.: 22903
Email: m.shannag@ju.edu.jo ; mohammad_al_shannag@hotmail.com
- Text book:** R.M Felder and R.W. Rousseau, *Elementary Principles of Chemical Processes*, Global Edition, Wiley, New York (2016).

Other interesting references:

Books: D.M. Himmelblau and J.B. Riggs, *Basic Principles and Calculations in Chemical Engineering*, 7th Ed., Prentice Hall.

Journals:

- Chemical Engineering Journal:
<http://www.journals.elsevier.com/chemical-engineering-journal/>
- Chemical Engineering Science:
<http://www.journals.elsevier.com/chemical-engineering-science>

- Course website:** <https://elearning.ju.edu.jo/>

6. Course information:

- Catalog description:** The role of the chemical engineer; Units and dimensions; Conversion of units; Systems of units; Dimensional homogeneity; Process data representation; Processes and process variables; Degrees of freedom analysis; Elementary mathematical tools for solving balance equations; Material balances for non reactive and reactive systems; Material balance on single phase and multiphase systems.
- Prerequisite:** 0303101 Chemical Engineering Principles (1)
- Course classification:** Mandatory course in the B.Sc. program.

7. Specific goals of the course:

This course is devoted primarily to the basic principles of chemical engineering. Upon the successful completion of the course, the student will be able to:	Chemical Engineering program outcomes:						
	O1	O2	O3	O4	O5	O6	O7
Differentiate between chemistry and chemical engineering.							
Convert quantities/equations from one set of units to another.							
Perform interpolation/extrapolation of tabulated data							
Perform curve fitting using graphical method							
Deal with rectangular and logarithmic scales in curve fitting and the corresponding graphical representation.							
Define, calculate, and estimate process variables including fluid density, flow rates, chemical composition of mixtures (mass fractions, mole fractions, and concentrations), pressure, and temperature.							
Classify the process as batch/semi-batch/continuous							



and as reactive/nonreactive.								
Draw and completely label process flowchart from verbal process description.								
Carry out degree-of-freedom analysis for the completely labeled process flowchart								
Write and solve material balance equations for single-unit and multiple-unit reactive/nonreactive processes								
Understand the significance of the recycle, bypass, and purge streams and solve material balance equations for processes that have such streams								
Perform pressure-volume-temperature calculations for ideal and real gases.								
Incorporate vapor/liquid, solid/liquid, and liquid/liquid equilibrium concepts into material balance calculations.								
know if he or she has chosen the right field of study								

8. Course topics: Course topics will be covered through around 42 (50 minutes) classes according to the following distribution:

Topic	# of Classes
What is chemical engineering?	1
Units and dimensions and dimensional consistency	4
Data, data presentation and data analysis	3
Process variables	3
Material balances on non-reacting systems	4
Recycle, by-pass & purge calculations	2
Material balances on multi-unit processes	3
Chemical reactions and material balances on reacting systems	3
Material balances on systems with combustion reactions	2
Material balances on singles phase systems: solid, liquid or ideal/real gases	3
Material balances on multiphase systems: vapor/liquid, solid/liquid, or liquid/liquid operations.	4

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.

Quizzes. There will be a number of announced/unannounced quizzes during the semester. Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes.

Computer skills. You are encouraged to use computer softwares such as excel, Matlab, or Polymath to perform the required computations and to represent your findings in graphs or tables.

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

- First exam: 20%



- Second exam 20%
- Quizzes: 20%
- Final exam: 40%

10. Contribution of Course to Meeting the Professional Component:

This course contributes to building the fundamental concepts in fluid mechanics and its applications in Chemical Engineering.

10. Relationship to Program Outcomes (%):

A	B	C	D	E	F	G	H	I	J	K
50				45						5

10. Relationship to Chemical Engineering Program Objectives:

PEO1	PEO2	PEO3	PEO 4
√	√	√	√

Prepared by: Prof. Mohammad Al-Shannag
Last Modified: September 7, 2018