Jordan University of Science and Technology
Faculty of Engineering
Chemical Engineering Department

ChE 575: Plant Design

3 credit hour, 3 contact hour lecture, 3 credit hour Eng.

Instructor

Instructor: Dr. Mohammed Azzam E-mail**:** azzam@just.edu.jo

Textbooks & References

A. Textbook

	Textbook 1
Title	Plant Design and Economics for Chemical Engineers
Author(s)	M.S. Peters, K.D. Timmerhaus, and R. E. West
Publisher	McGraw-Hill
Year	2003
Edition	5th

B. References

1. W.D. Baasel, "Preliminary Chemical Engineering Plant Design", Elsevier, New York, 1974.
2. R. Turton, R.C. Bailie, W.B. Whiting, and J.A. Shaeiwitz, "Analysis, Synthesis, and design of Chemical Processes", Prentice Hall, New Jersey, 1998.
3. E.E. Ludwig, "Applied Process Design for Chemical and Petrochemical Plants", Gulf Publishing Company, Houston, USA, Vol. 1,2 and 3 (1995, 1997 and 2001).
4. D.W. Green & R.H. Perry. “Perry’s Chemical Engineers Handbook”, 8th edition, McGraw-Hill Book Company, 2007.
5. R.K. Sinnott. “Coulson & Richardson’s Chemical Engineering, Volume 6, Chemical Engineering Design”, 4th edition, Elsevier Butterworth-Heinemann, 2005.
6. W.D. Seider, J.D. Seader, D.R. Lewin, and S. Widagdo. “Product and Process Design Principles: Synthesis, Analysis and Design”, 3rd edition, John Wiley, New York, 2008.
7. J.M. Douglas. “Conceptual Design of Chemical Processes”, McGraw-Hill, 1988.
8. American institute of chemical engineers, "Plant design and cost estimation", AMICHEM, 1985.

Specific Course Information

A. Course Catalog:
Process design development. General plant design considerations: health and safety, environmental factors, plant location and plant layout. Computer aided design. Economic principles including cost estimation. Design optimization. Report writing. Case studies.

B. Prerequisites or co-requisites
CHE 401- Engineering Economy
CHE 471- Equipment Design

C. Required, Elective or Selected Elective
Required

Objectives and Outcomes*

1. Apply the knowledge of the stages of plant design [1,2]
2. Decide on plant locations and plant layout for chemical industries [1,2,4,7]
3. Appreciate health and safety issues versus plant design. [1,2,4]
4. Account for environmental concerns and pollution treatment in the design of chemical plants [1,2,4]
5. Estimate total project cost and its profitability [1,6]
6. Write and present technical reports for design projects [3,5]
7. Appreciate applying Computer Aided Design Software in plant design. [2].
8. You gain a better understanding of professional and ethical responsibility versus design [4]
9. You recognize the need for life-long learning [7]
10. Perform HAZOP study on a chemical process [2,3,4,5,6,7]

Contribution of Course to Meeting the Professional Component

Relationship to Student Outcomes (%)

1	2	3	4	5	6	7
25	25	10	20	10	5	5

Relationship to Chemical Engineering Program Objectives

PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
Y	Y	Y	Y	-	Y

Topics Covered

- Plant Design Project Steps
- Preliminary Design
- Feasibility Survey
- Literature Survey
- Plant Location
- Health and Safety Hazards
- Environmental Issues
- Plant Layout
- Computer Aided Design
- Cost Estimation
- Plant Design Economic
- Interest, Capitalized Cost, Present Value, Taxes, Insurance, Depreciation, Profitability and Profit Indicators
- The Design Report: Written Report, Oral Report
- HAZOP study

Evaluation

Assessment Tool	**Expected Due Date**	**Weight**
Homework & Quizzes	One week after homework problems are assigned	10%
First Exam	According to the schedule posted by the Department	25 %
Second Exam	According to the schedule posted by the Department	25 %
Final Exam	According to the schedule posted by the University for the finals' exams	40 %

* Number in brackets refer to the Program outcomes