

CHEE 5369/6369

Chemical Process Economics II

Catalog Data: Chemical Process Economics Cr. 3 (3-0). Prerequisites: Senior standing and approval of instructor/advisor.

Fundamental concepts in financial analysis of chemical and other industrial projects. Methods of cost estimation. Project control tools.

Textbooks:

Engineering Economy, 5th ed., (2002), McGraw-Hill, by Leland Blank and Anthony Tarquin.

Finance and Accounting for Nonfinancial Managers, 5th ed., (2003), Perseus Press, by William G. Droms.

Prerequisites by Topic:

1. Ability to use electronic spreadsheets
2. Ability to use mathematics of compound growth (compound interest)

Topics: (each class is 80 minutes, two classes per week)

1. Introduction, basic concepts of financial accounting, cash flow (5 classes).
2. Principles of Engineering Economy applied to equivalence and profitability of projects. (10 classes).
3. Estimating methods (3 classes).
4. Project control (3 classes).
5. Special measurement tools (5 classes)

Expected Course Outcomes and Performance Criteria:

Demonstrate knowledge of the difference between profit/loss and cash flow. **(a)**¹

Demonstrate the ability to analyze projects for profitability. **(e)**

Demonstrate understanding of cost estimation. **(k)**

Demonstrate ability to assess the impact of economic constraints on engineering solutions. **(h)**

Demonstrate ability to apply the knowledge of cost estimation and profitability evaluation to conduct and present the results of a case study. **(g)**

¹ Lowercase letters in parentheses refer to ABET outcomes under Criterion 3 (see Appendix).

Appendix

ABET Outcome, Criterion 3	Program-Specific Outcomes
(a) an ability to apply knowledge of mathematics, science and engineering.	<ul style="list-style-type: none"> • Use chemistry and physics concepts to set up and solve chemical engineering problems • Use mathematical tools to solve chemical engineering problems
(b) an ability to design and conduct experiments as well as to analyze and interpret data.	<ul style="list-style-type: none"> • Select appropriate experimental equipment and techniques necessary to solve a given problem • Evaluate and interpret experimental results using statistical tools and chemical engineering concepts
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health & safety, manufacturability, and sustainability.	<ul style="list-style-type: none"> • Apply material and energy balance concepts to design a unit operation • Define objectives and perform the design of an integrated chemical process under realistic constraints
(d) an ability to function on multi-disciplinary teams.	<ul style="list-style-type: none"> • Define roles and responsibilities to align with capabilities of team members and fulfill project requirements • Develop and carry out a project plan through team work
(e) an ability to identify, formulate and solve engineering problems.	<ul style="list-style-type: none"> • Translate an engineering problem into a mathematical model or other suitable abstraction • Use mathematical model or other suitable abstraction to solve an engineering problem and interpret results
(f) an understanding of professional and ethical responsibility.	<ul style="list-style-type: none"> • Demonstrate knowledge of professional code of ethics. • Identify ethical issues and make decisions for a chemical engineering problem.
(g) an ability to communicate effectively.	<ul style="list-style-type: none"> • Make presentations that are factual and tailored to the audience • Can communicate in writing to non-technical and technical audiences
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	<ul style="list-style-type: none"> • Understand the impact of chemical engineering solutions in a global, economic, environmental, and societal context.
(i) a recognition of the need for and an ability to engage in life-long learning.	<ul style="list-style-type: none"> • Recognize the importance of advanced education and development opportunities • Identify, retrieve, and organize information necessary to solve open-ended problems
(j) a knowledge of contemporary issues.	<ul style="list-style-type: none"> • Know the interplay between current technical and societal issues • Know the recent history, current status, and future trends of chemical engineering
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	<ul style="list-style-type: none"> • Use modern software to solve chemical engineering problems • Understand how to operate equipment relevant to chemical engineering systems