Course Specification
(Bachelor)

Course Title: Engineering Economy	
Course Code: GE 1403	
Program: Architecture, Chemical, Civil, Electrical, Industrial, and Mechanical Engineering	
Department: Department of Chemical Engineering	
College: College of Engineering	
Institution: Imam Mohammad Ibn Saud Islamic University	
Version: 03	
Last Revision Date: 01/01/2025	

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A. General information about the course:

1. Course Identification

1. Credit hours: 03
Theory (3) + tutorial (1)

2. Course type

A.	☐University	☒ College	☒ Department	☐Track	☐Others
B.	✓ ☒ Required			☐Elective	

3. Level/year at which this course is offered: Level 6, 3rd Year

4. Course general Description:

Time value of money formulas; Application of time value of money formulas; Project selection using net present worth analysis by the common multiple and study period methods; One and two parameter sensitivity analysis; Bond cash flows and pricing; Loan amortization and determining the remaining principle on a loan; Project selection using annual equivalent worth; Project selection using the incremental net present worth; Annual depreciation and book value using straight line; Declining balance and MACRS methods; Annual cash flow and net present worth; Discounted benefit/cost ratio for a public project; Inflation in estimating future cash flows; Defender/challenger replacement analysis using net present worth.

5. Pre-requirements for this course (if any):

MAT 1236

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

1. To develop an understanding of time value of money and its relation with interest.
2. To understand the importance of inflation in an economic equivalence calculation.
3. To understand the concept of conventional and discounted payback periods and their role in economic decisions.
4. To understand different project evaluation criteria like present and future worth analyses, capitalized equivalent method, annual equivalent analysis, unit profit method.
5. To understand the concept of rate of return and its impact on economic analysis.
6. To satisfy the practical needs of an engineer towards making the financial decisions when acting as a team member or a project manager for an engineering project.

7. To incorporate all critical decision-making tools including the most contemporary computer-oriented ones that engineers bring to the task of making the financial decisions.
8. To build a thorough understanding of the theoretical and conceptual basis upon which the practice of financial project analysis is built.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	15
5.	**Others (specify)**	
Total		60

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	List various principles of economics and understand concept of time value of money.	K1	Class lectures / Discussion/tutorials	Quiz/Exams / HW
1.2	Define key economic terminologies (Simple and	K1	Class lectures / Discussion/tutorials	Quiz/Exams / HW

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	Compound interests, present worth, future worth, annual worth, perpetuity, CPI, inflation, deflation, MARR, salvage value, capital and operating costs, service and revenue projects, Internal rate of return etc.			
...				
2.0		**Skills**		
2.1	Perform actual and constant dollar analysis for various economic problems and case studies.	S1	Class lectures / Discussion/tutorials	Quiz/Exams / HW
2.2	Develop cash flow diagrams.	S1	Class lectures / Discussion/tutorials	Quiz/Exams / HW
2.3	Evaluate net present worth and annual equivalent worth of single and multiple projects.	S1	Class lectures / Discussion/tutorials	Quiz/Exams / HW
3.0	**Values, autonomy, and responsibility**			
3.1	Assess the feasibility of a project based on unit profit and unit cost calculations.	S1, V1	Class lectures / Discussion/tutorials	Quiz/Exams / HW
3.2	Assess the feasibility of a project using Microsoft Excel.	S6	Class lectures / Discussion/tutorials	Quiz/Exams / HW
...				

C. Course Content

No	List of Topics	Contact Hours
1	Introduction and Engineering Economic Decisions	4
2	Time value of money	8
3	Money management	8
4	Equivalence calculations under inflation	8
5	Present worth analysis	9
6	Annual Equivalence Analysis	9
7	Rate of return analysis	7
8	Benefit Cost Analysis	7
Total		**60**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1	Home assignments and project	Biweekly	10%
2	Quizzes	Biweekly	10%
3	Midterm 1	Week 7	20%
4	Midterm 2	Week 12	20%
5	Final Exam	Week 16	40%
...			**100 %**

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Chan S. Park, Fundamentals of Engineering Economy:2013, 3rd edition, Pearson.
Supportive References	L. Blank, A. Tarquin, Engineering Economy, 2011, 7th edition, McGraw-Hill.
Electronic Materials	Wall Street Journal, Forbes and The economist
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Standard classroom with multimedia and computer lab
Technology equipment (Projector, smart board, software)	Microsoft Excel
Other equipment (Depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Survey (indirect)
Effectiveness of Students assessment	Students	Survey (indirect)

Assessment Areas/Issues	Assessor	Assessment Methods
Quality of learning resources	Students	Survey (indirect)
The extent to which CLOs have been achieved	Faculty	CLO-KPI analysis (direct)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	DEPARTMENT OF CHEMICAL ENGINEERING
REFERENCE NO.	DEPARTMENT MEETING # 05
DATE	5/4/1446H - 8/10/2024G