Department	General Study	Major							
Course Name	Engineering Economy	Course Code	GNRL 405						
Prerequisites	-	Credit Hours	2			CTH		2	
		CRH	L	2	P	0	T	0	

Course Description:

This course aims at providing the student with basic concepts of engineering economic analysis and its role in engineering decision making. It is designed to offer the students the tools needed for rigorous presentation of the effect of the time value of money on engineering problem solving and the capacity to act with efficient professionalism. The course introduced include foundations of engineering economy, nominal and effective interest rates, engineering economy factors, present worth analysis, annual worth analysis, rate of return analysis, benefit/cost analysis and public-sector economics, breakeven and payback analysis, and depreciation.

General Objective:

The objective of this course is to give the working engineer an overview of the economics methods employed in effective engineering decisions as related to the designing, planning and implementation of successful projects.

Detailed Objectives:

Trainee will be able to:

1-	Recognize the time value of money and the factors that allow the conversion of money through time.
2-	Identify and compare different interest rates i.e., simple, compound, MARR, ROR, nominal and effective.
3-	Convert given cash-based problems into a cash flow using a cash flow diagram.
4-	Compute equivalent values for time-based cash flows of varying complexities.
5-	Compare projects alternatives by different techniques based on equivalent Present Worth (PW), Future Worth (FW), Capitalized Cost (CC), Payback Period (P**b**P), Annual worth (AW) values and Benefit Cost ratios (B/C).
6-	Compute depreciations related to projects using Straight Line (SL) and Declining Balance (DB).
7-	Use EXCEL spreadsheets and financial functions to model and solve engineering economic analysis problems.

Detailed of Theoretical Contents				
Hours	**Contents**			**Assessment Tools**
5	**Fundamentals of Engineering Economy:** • Engineering economics: description and role in decision making process. • Performing an Engineering Economy Study. • Interest Rate and Rate of Return (ROR). • Economic Equivalence. • Terminology and Symbols. • Simple and Compound Interest. • Cash Flows: Their Estimation and Diagramming (CFD). • Minimum Attractive Rate of Return (MARR). • Spreadsheets use in engineering economy.			Quiz:1 Exam:1 Final Exam
	Textbook	1	Leland Blank, Anthony Tarquin. "Engineering Economy". McGraw-Hill. Eighth edition. New York. McGraw-Hill Science Engineering Math, 2018, 653 pages. ISBN 978-0-07-352343-9.	
		2	Eschenbach, Ted G. "Engineering Economy - Applying Theory to Practice". 3rd edition. New York: Oxford University Press, 2011, 631 pages. ISBN 978-0-19-976697-0.	
5	**Factors: How Time and Interest Affect Money:** • Single-Payment Factors (F/P and P/F). • Uniform Series Formulas (P/A, A/P, A/F, F/A). • Arithmetic Gradient Factors (P/G and A/G). • Geometric Gradient Series Factors. • Calculations for Cash Flows That Are Shifted. • Using Spreadsheets for Equivalency Computation.			Quiz: 2 Exam:1 Final Exam
	Textbook	1	Leland Blank, Anthony Tarquin. "Basics of Engineering Economy". First edition. Boston. McGraw-Hill Science Engineering Math, 2007, 436 pages. ISBN 978-0-07-340129-4.	
		2	Eschenbach, Ted G. "Engineering Economy - Applying Theory to Practice". 3rd edition. New York: Oxford University Press, 2011, 631 pages. ISBN 978-0-19-976697-0.	
		3	Mehta, Merwan. "Applied Engineering Economics Using Excel". First edition. Industrial Press, 2015, 272 pages. ISBN 978-0-83-113501-0.	
3	**Nominal and Effective Interest Rates:** • Difference Between Nominal and Effective Interest Rates. • Calculating the Effective Interest Rate. • Formulation Equivalence Calculations Involving Only Single Amount Factors. • Equivalence Calculations Involving Series with PP ≥ CP and with PP < CP.			Exam:1 Final Exam

Detailed of Theoretical Contents				
Hours	**Contents**			**Assessment Tools**
	Textbook	1	Leland Blank, Anthony Tarquin. "Engineering Economy". McGraw-Hill. Eighth edition. New York. McGraw-Hill Science Engineering Math, 2018, 653 pages. ISBN 978-0-07-352343-9.	
		2	Leland Blank, Anthony Tarquin. "Basics of Engineering Economy". First edition. Boston. McGraw-Hill Science Engineering Math, 2007, 436 pages. ISBN 978-0-07-340129-4.	
3	**Present Worth Analysis:** • Present Worth Analysis of Equal-Life Alternatives. • Present Worth Analysis of Different-Life Alternatives. • Capitalized Cost Analysis. • Evaluation of Independent Projects. • Using Spreadsheets for Present Worth Analysis.			
	Textbook	1	Leland Blank, Anthony Tarquin. "Basics of Engineering Economy". First edition. Boston. McGraw-Hill Science Engineering Math, 2007, 436 pages. ISBN 978-0-07-340129-4.	
		2	Kal Renganathan Sharma. "An Introduction to Engineering Economics". First edition. Cognella Academic Publishing, 2015, 146 pages. ISBN 978-1-60650-709-4.	
3	**Annual Worth Analysis:** • Advantages and Uses of Annual Worth Analysis. • AW Value Calculation. • Evaluating Alternatives Based on Annual Worth. • AW of a Permanent Investment.			Quiz:3 Exam:2 Final Exam
	Textbook	1	Leland Blank, Anthony Tarquin. "Engineering Economy". McGraw-Hill. Eighth edition. New York. McGraw-Hill Science Engineering Math, 2018, 653 pages. ISBN 978-0-07-352343-9.	
		2	Leland Blank, Anthony Tarquin. "Basics of Engineering Economy". First edition. Boston. McGraw-Hill Science Engineering Math, 2007, 436 pages. ISBN 978-0-07-340129-4.	
4	**Rate of Return (ROR) Analysis:** • Interpretation of a ROR value. • ROR calculation using a PW or AW relation. • Using ROR analysis to evaluate a single project.			Quiz:4 Exam:2 Final Exam
	Textbook	1	Leland Blank, Anthony Tarquin. "Engineering Economy". McGraw-Hill. Eighth edition. New York. McGraw-Hill Science Engineering Math, 2018, 653 pages. ISBN 978-0-07-352343-9.	
		2	Leland Blank, Anthony Tarquin. "Basics of Engineering Economy". First edition. Boston. McGraw-Hill Science Engineering Math, 2007, 436 pages. ISBN 978-0-07-340129-4.	

Detailed of Theoretical Contents				
Hours	**Contents**			**Assessment Tools**
3	**Benefit/Cost Analysis and Public-Sector Economics:** • The Fundamental Differences Between Public and Private Sector projects. • Benefit/Cost Analysis of a Single Project.			
	Textbook	1	Leland Blank, Anthony Tarquin. "Engineering Economy". McGraw-Hill. Eighth edition. New York. McGraw-Hill Science Engineering Math, 2018, 653 pages. ISBN 978-0-07-352343-9.	
		2	Eschenbach, Ted G. "Engineering Economy - Applying Theory to Practice". 3rd edition. New York: Oxford University Press, 2011, 631 pages. ISBN 978-0-19-976697-0.	
3	**Breakeven and Payback Analysis:** • Breakeven Analysis for a Single Project. • Breakeven Analysis Between Two Alternatives. • Payback Analysis.			
	Textbook	1	Leland Blank, Anthony Tarquin. "Engineering Economy". McGraw-Hill. Eighth edition. New York. McGraw-Hill Science Engineering Math, 2018, 653 pages. ISBN 978-0-07-352343-9.	
		2	William G. Sullivan, Elin M. Wicks, C. Patrick Koelling. "Engineering Economy". Sixteenth Edition. Boston. Pearson Education, 2015, 701 pages. ISBN 978-0-13-343927-4.	
3	**Depreciation Methods:** • Depreciation Terminology. • Straight Line (SL) Depreciation. • Declining Balance (DB). • Using Spreadsheets for Depreciation Computation.			Quiz:5 Final Exam
	Textbook	1	Leland Blank, Anthony Tarquin. "Basics of Engineering Economy". First edition. Boston. McGraw-Hill Science Engineering Math, 2007, 436 pages. ISBN 978-0-07-340129-4.	
		2	Mehta, Merwan. "Applied Engineering Economics Using Excel". First edition. Industrial Press, 2015, 272 pages. ISBN 978-0-83-113501-0.	

Textbooks	• Leland Blank, Anthony Tarquin. “Engineering Economy”. McGraw-Hill. Eighth edition. New York. McGraw-Hill Science Engineering Math, 2018, 653 pages. ISBN 978-0-07-352343-9.
	• Leland Blank, Anthony Tarquin. “Basics of Engineering Economy”. First edition. Boston. McGraw-Hill Science Engineering Math, 2007, 436 pages. ISBN 978-0-07-340129-4.
	• Eschenbach, Ted G. “Engineering Economy - Applying Theory to Practice”. 3rd edition. New York: Oxford University Press, 2011, 631 pages. ISBN 978-0-19-976697-0.
	• Kal Renganathan Sharma. “An Introduction to Engineering Economics”. First edition. Cognella Academic Publishing, 2015, 146 pages. ISBN 978-1-60650-709-4.
	• William G. Sullivan, Elin M. Wicks, C. Patrick Knelling.“Engineering Economy”. Sixteenth Edition. Boston. Pearson Education, 2015, 701 pages. ISBN 978-0-13-343927-4.
	• Mehta, Merwan. “Applied Engineering Economics Using Excel”. First edition. Industrial Press, 2015, 272 pages. ISBN 978-0-83-113501-0.