Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
IND 511	Advanced Engineering Economy	1	3	0	0	3	6

Prerequisites	
Admission Requirements	
Language of Instruction	English
Course Type	Compulsory
Course Level	Masters Degree
Objective	
Content	- Introduction and organization - Review of discrete cash flow models - Uniform and gradient series - Nominal versus effective interest rates - Continuous compounding and continuous cash flows - Mid-period convention - Time-dependent interest rates - Loans - Laplace, Z and Mellin transforms in cash flow modeling - Equivalent methods for comparing alternatives (single project) - Present worth, future worth and annual worth methods - Benefit-cost ratio method - Rate of return method and variations - Internal rate of return method - External rate of return method - Decision rules for selecting among multiple alternatives - Present worth, future worth and annual worth methods - Benefit-cost ratio method - Internal rate of return method - Approximate and supplementary methods - Payback method - Profitability index - Depreciation methods - After-tax economy studies - Index numbers - Incorporating inflation into economic analysis - Replacement models - Retirement with identical replacement - Generalized replacement model - Dynamic programming formulations - Mathematical programming formulations for capital budgeting - Risk analysis - Statistical moments of random variables - Random cash flows - Random project life - Decision criteria and methods for risk and uncertainty - Fuzzy discounted cash flow analysis - Introduction to real options approach
References	- Park, C.S., Sharp-Bette, G.P., Advanced Engineering Economics, John Wiley & Sons, 1990. - Fleischer, G.A., Introduction to Engineering Economy, PWS Publishing Company, Boston, 1994.

Theory Topics

Week	Weekly Contents
1	Introduction and organization, Review of discrete cash flow models, Uniform and gradient series, Nominal versus effective interest rates.
2	Continuous compounding and continuous cash flows, Mid-period convention, Time-dependent interest rates, Loans, Laplace, Z and Mellin transforms in cash flow modeling.
3	Equivalent methods for comparing alternatives (single project), Present worth, future worth and annual worth methods, Benefit-cost ratio method, Rate of return method and variations, Internal rate of return method, External rate of return method.

Week	Weekly Contents
4	Decision rules for selecting among multiple alternatives, Present worth, future worth and annual worth methods, Benefit-cost ratio method, Internal rate of return method, Approximate and supplementary methods, Payback method, Profitability index.
5	Depreciation methods, After-tax economy studies.
6	Index numbers, Incorporating inflation into economic analysis.
7	Replacement models, Retirement with identical replacement, Generalized replacement model, Dynamic programming formulations.
8	Mathematical programming formulations for capital budgeting.
9	Midterm
10	Risk analysis, Statistical moments of random variables, Random cash flows, Random project life.
11	Decision criteria and methods for risk and uncertainty.
12	Fuzzy discounted cash flow analysis.
13	Introduction to real options approach.
14	Project presentations.