Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
IND401	Decision Analysis	7	3	0	0	3	4

Prerequisites	IND371 VE IND211
Admission Requirements	IND371 VE IND211

Language of Instruction	English
Course Type	Elective
Course Level	Bachelor Degree
Objective	This course helps improve the quality of the choices in managerial and personal decisions involving major uncertainties. It provides methods to help structure decision problems and analyze them quantitatively. Such methods include models for decision-making under conditions of uncertainty or multiple criteria, techniques of risk analysis and risk assessment.
Content	Introduction to Decision Analysis, What is Decision Analysis? Basic concepts., Structuring Decision Problems, (alternatives, consequences, objectives, and uncertainties). Votation, Social Choice Theory and Social Choice Functions, Decision making under uncertainty (Models and Choices) Decision criteria (Maximin, Maximax, Minimax Regret, The Expected Value Criterion). Decision making under risk. What is Risk Analysis? Basic concepts. Decision trees and influence diagrams. Risk Attitudes, Risk Management and Risk Measurement, Utility Theory, Utility Assessment. the preference assessment procedures. Determination of the Decision-Maker's Utility, Modeling Risk and Uncertainty, Modeling risk attitude Certainty valants, Influence Diagrams, Decision Trees and Decision Tables, Bayes' Rule. Probability modeling and expert judgment. Expert Judgment and/or Group Participation. Decision Making Under Multiple Criteria (Analytic Hierarchy Process Topsis, Electre) echniques for weighting criteria. Sensitivity robustness analysis. Game Theory
References	R. T. Clemen, Making Hard Decisions: An Introduction to Decision Analysis, 2nd Edition, Duxbury Press, Belmont, CA, 1996 Operations Research: An Introduction (8th Edition) Hamdi A. Taha Operations Research: Applications and Algorithms Wayne L. Winston Frederick S. Hillier, Gerald J. Lieberman, Introduction to Operations Research, Ninth Edition, 2010 Mc GrawHill.

Theory Topics

Week	Weekly Contents
1	Introduction to Decision Analysis, What is Decision Analysis? Basic concepts
2	Structuring Decision Problems, (alternatives, consequences, objectives, and uncertainties).
3	Votation, Social Choice Theory and Social Choice Functions
4	Decision making under uncertainty (Models and Choices) Decision criteria (Maximin, Maximax, Minimax Regret, The Expected Value Criterion)
5	Decision making under risk. What is Risk Analysis? Basic concepts. Decision trees and influence diagrams
6	Risk Attitudes, Risk Management and Risk Measurement
7	Utility Theory, Utility Assessment. the preference assessment procedures
8	Determination of the Decision-Maker's Utility, Modeling Risk and Uncertainty, Modeling risk attitude Certainty Equivalants

Week	Weekly Contents
9	Influence Diagrams, Decision Trees and Decision Tables
10	Bayes' Rule. Probability modeling and expert judgment.
11	Bayes' Rule. Probability modeling and expert judgment.
12	Decision Making Under Multiple Criteria (Analytic Hierarchy Process Topsis, Electre)
13	Techniques for weighting criteria. Sensitivity and robustness analysis
14	Game Theory