School of Business and Management Sciences / Management Information Systems (English)

2023 - 2024 Academic Year

QUANTITATIVE METHODS for BUSINESS DECISION MAKING

Syllabus

Course Description					
Name	**Code**	**Semester**	**T+A Hour**	**Credit**	**ECTS**
QUANTITATIVE METHODS for BUSINESS DECISION MAKING	MIS3112176	Fall Semester	3+0	3	5

Prerequisites Courses	
Recommended Elective Courses	
Language of Instruction	English
Course Level	First Cycle (Bachelor's Degree)
Course Type	Required
Course Coordinator	Assist.Prof. Esra BAYTÖREN
Name of Lecturer(s)	Assist.Prof. Esra BAYTÖREN
Assistant(s)	
Aim	The aim of this course is to ensure that students have the necessary qualifications and infrastructure to formulate and solve business decision problems using quantitative techniques such as single and multi-criteria decision analysis, Markov analysis, and simulation modeling.
Course Content	This course contains; Decision Theory - Basic Concepts, Characteristics of Decision Problemlems, and Decision Environments (Risk, Ignorance, Uncertainty),Utility Theory, Rationality and Decision Making,Decision Making Under Ignorance (Uncertainty),Decision Making Under Risk,Multi-Stage Decisions and Decision Trees,Bayesian Decision Analysis,Game Theory,Markov Analysis,Group Decisions and Social Choice,Multi-Criteria Decision Making - Basic Concepts,Multi-Criteria Decision Making - Analytic Hierarchy Process,Multi-Criteria Decision Making - Analytic Network Process,Data Envelopment Analysis,Simulation - Basic Concepts and Applications.

Course Learning Outcomes	**Teaching Methods**	**Assessment Methods**
1. Will be able to describe the elements of decision theory and the distinction between individual and group decisions.	10, 12, 16, 9	A, E
1.1 Explains what should be taken into consideration when determining the objective, alternatives and states of the nature for a decision process		
1.2 Describes the characteristics of both individual and group decisions		
2. Will be able to realize the solutions of decision making under uncertainty and risk.	10, 12, 16, 9	A, E
2.1 Uses such basic strategies as maximin, maximax, and regret criteria for decision problems under uncertainty		
2.2 Uses such basic strategies as expected value, maximum likelihood, and expected value of perfect information for decision problems under risk		
3. Will be able to express the value of experimentation in decision process.	10, 12, 16, 9	A, E
3.1 Constructs probability tree diagrams		
3.2 Estimates revise probability using Bayesian analysis		
4. Will be able to determine future states or conditions by using Markov analysis.	10, 12, 16, 9	A, E
4.1 Explains the place of Markov process models in decision processes		
4.2 Computes long-term (steady-state) conditions by using the transition matrix probabilities		
5. Will be able to design multi-criteria decision problems.	10, 12, 16, 9	A, E
5.1 Explains the importance of building decision frame for a multicriteria decision making problem		
5.2 Uses such techniques as AHP, ANP, Topsis, and Vitor for multicriteria decision making process		
6. Will be able to explain the advantages and disadvantages of simulation.	10, 12, 16, 9	A, E
6.1 Identifies the necessity of simulation technique in a decision process		
6.2 Constructs simple simulation models using Excel		

Teaching Methods	10: Discussion Method, 12: Problem Solving Method, 16: Question - Answer Technique, 9: Lecture Method
Assessment Methods	A: Traditional Written Exam, E: Homework

Lecture Schedule

Sequence	**Topics**	**Preliminary Preparation**
1	Decision Theory - Basic Concepts, Characteristics of Decision Problemlems, and Decision Environments (Risk, Ignorance, Uncertainty)	
2	Utility Theory, Rationality and Decision Making	
3	Decision Making Under Ignorance (Uncertainty)	
4	Decision Making Under Risk	
5	Multi-Stage Decisions and Decision Trees	
6	Bayesian Decision Analysis	
7	Game Theory	
8	Markov Analysis	
9	Group Decisions and Social Choice	
10	Multi-Criteria Decision Making - Basic Concepts	
11	Multi-Criteria Decision Making - Analytic Hierarchy Process	
12	Multi-Criteria Decision Making - Analytic Network Process	
13	Data Envelopment Analysis	
14	Simulation - Basic Concepts and Applications	

Evaluation Methods	**Weight(%)**
(Midterm Exam) 1st assignment as a part of midterm exam	20
(Midterm Exam) 2nd assignment as a part of midterm exam	20
Midterm Exam	40
General Exam	60

Resources
[1] Quantitative Analysis for Management, B.Render & R.M.Stair & M.E.Hanna, 11th Edition, Pearson, 2012
[2] An Introduction to Decision Theory, Martin Peterson, Cambridge University Press, 2009
[3] Multi-Criteria Decision Making Methods: A Comparative Study, Panos M. Pardalos ve Donald Hearn (Editors), Springer Science+Business Media Dordrecht, 2000
[4] Lecture Notes
[5] Çok Kriterli Karar Verme Yöntemleri, B.Fatih Yıldırım ve Emrah Önder (Editörler), 2.Baskı, Dora Yayınları, 2015
[6] Karar Teorisi, Zerrin Aladağ, 2. Baskı, Umuttepe Yayınlar, 2014
[7] Karar Verme, Mustafa Aytaç ve Necmi Gürsakal (Editörler), Dora Yayınları, 2015