

DYNAMIC PROGRAMMING

1	Course Title:	DYNAMIC PROGRAMMING
2	Course Code:	EKO6120
3	Type of Course:	Optional
4	Level of Course:	Third Cycle
5	Year of Study:	1
6	Semester:	2
7	ECTS Credits Allocated:	4.00
8	Theoretical (hour/week):	2.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	None
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Dr. ESMA BİRİŞÇİ
15	Course Lecturers:	Dr. Öğr. Üyesi Esma Birişçi
16	Contact information of the Course Coordinator:	esmabirisci@uludag.edu.tr Telefon:0224 2941016 Bursa Uludağ Üniversitesi İİBF A blok
17	Website:	
18	Objective of the Course:	The aim of this section is to develop an understanding of the theory of dynamic programming and to discuss different research areas such as revenue management, healthcare, revenue management, production planning, warehouse control and maintenance. The focus of the course will be on the theory as well as applications of the Dynamic Programming technique to different research areas. This course is a basic introduction to the theory of Dynamic Programming and some applications.
19	Contribution of the Course to Professional Development:	Within the scope of the course, students develop analytical thinking and problem-solving skills by understanding nonlinear and dynamic programming techniques in complex problems. In addition, they gain advantage in risk management and strategic decision-making processes by learning advanced methods for modeling uncertainty and solving stochastic problems. These gains enable students to have strong technical competencies and versatile expertise in the business world by expanding their application knowledge in different areas such as inventory management, pricing, production and revenue management.
20	Learning Outcomes:	
	1	Understand the main ideas of nonlinear and dynamic programming techniques in deterministic problems
	2	Model the uncertainty inherent in real-world dynamic problems by formulating finite and infinite horizon stochastic dynamic problems.
	3	Apply backward induction, value iteration, and policy iteration to solve finite and infinite horizon problems and formulate dynamic programs as linear programs
	4	Ability to apply different types of dynamic programming in different application areas, such as inventory control, pricing, production, and revenue management
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21	Course Content:			
	Course Content:			
Week	Theoretical	Practice		
1	Introduction to the main ideas of nonlinear programming and the role of dynamic programming in nonlinear optimization.			
2	Shortest path problem. Optimality principle. Examples			
3	Controlled Markov chains. Finite horizon stochastic problems Dynamic programming equations.			
4	Dynamic programming equations. Applications			
5	Discounted infinite horizon problems			
6	Value and policy iteration methods. Linear programming approach			
7	Applications in inventory control, planning and logistics			
Activites		Number	Duration (hour)	Total Work Load (hour)
10	Methods for solving undiscounted problems	14	2.00	28.00
Practicals/Labs		0	0.00	0.00
12	Average cost problems	0	0.00	0.00
Homeworks		3	20.00	60.00
14	Introduction to approximate dynamic programming TD(2) Addition Q-learning	1	10.00	10.00
Field Studies		0	0.00	0.00
Midterm exams		1	10.00	10.00
22	Textbooks, References and/or Other	Ross, Sheldon M. Applied Probability Models with		
Others		0	0.00	0.00
Final Exams		1	10.00	10.00
Total Work Load				118.00
Total work load/ 30 hr		2008.		3.93
ECTS Credit of the Course				4.00
TERM LEARNING ACTIVITIES		NUMBER	WEIGHT	
Midterm Exam		1	20.00	
Quiz		3	20.00	
Home work-project		3	20.00	
Final Exam		1	40.00	
Total		8	100.00	
Contribution of Term (Year) Learning Activities to Success Grade		60.00		
Contribution of Final Exam to Success Grade		40.00		
Total		100.00		
Measurement and Evaluation Techniques Used in the Course		Written and practice questions.		

24	ECTS / WORK LOAD TABLE															
25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	4	5	5	4	4	5	5	5	4	4	5	5	5	5	5	4
ÖK2	4	3	4	5	4	5	5	5	4	5	4	5	4	5	4	5
ÖK3	4	5	5	5	5	5	5	5	5	5	5	5	5	5	4	4
ÖK4	5	5	4	4	4	3	3	4	4	4	4	3	4	4	3	4
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			