

SYSTEM ENGINEERING IN WATER RESOURCES

1	Course Title:	SYSTEM ENGINEERING IN WATER RESOURCES	
2	Course Code:	BSM5013	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
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:	Doç.Dr. HAKAN BÜYÜKCANGAZ	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	cangaz@uludag.edu.tr U.Ü. Ziraat Fakültesi Biyosistem Mühendisliği Bölümü 0.224.2941621	
17	Website:		
18	Objective of the Course:	The objective of this course is to learn optimization techniques for solving water resources engineering problems. Students will gain skills and knowledge for selecting optimum solutions amongst different alternatives	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Describe the water resources engineering problems
		2	Perform system analysis for water resources engineering problems
		3	Employ optimization methods for water resources engineering problems
		4	Choose appropriate method for given problem set
		5	State water resources engineering problems in mathematical terms
		6	Employ advanced optimization techniques
		7	Use software for advanced optimization techniques applications
		8	Interpret the results of optimization techniques applications
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		10	
21	Course Content:		
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Week	Theoretical	Practice	
1	Introduction to System Analysis, Concepts of System, Model, Model Construction, Operational Research and Optimization Techniques		

2	Introduction to Linear Programming, LP Problems and model construction			
3	Graphical Method in Linear Programming, Integer Linear Programming, Complications and Resolution			
4	Simplex Method in Linear Programming, Complications and Resolution			
5	Computer Applications in Linear Programming (LINDO, EXCEL, QSB) and Interpretation of Resolution			
6	Special Types of Linear Programming Problems, Duality and Degeneracy and Sensitivity Analysis			
7	Dynamic Programming			
8	Introduction to the Transportation Problem			
9	Transportation problem, Computational Procedure for solving transportation problems, Computer Applications			
10	Variation of Transportation Problem, Transshipment Models, Computational Procedure, Computer Applications			
11	Resource Allocation Problems, Computational Procedure, Computer Applications			
12	Network Analysis, PERT			
13	Markov Chains and its applications			
Activites		Number	Duration (hour)	Total Work Load (hour)
Theoretical Materials:	Engineering. Mcgraw-Hill Book Company New York. Hillier F. S. G. J. Lieberman 2004. Introduction to Operations Research, 6th Edition, Mcgraw-Hill Book Company	14	2.00	28.00
Practicals/Labs		0	0.00	0.00
Self study and preperation		14	2.00	28.00
Homeworks		0	0.00	0.00
23	Projects	0	0.00	0.00
Field Studies		0	0.00	0.00
Midterm exams		0	0.00	0.00
Midterm Exam		0	0.00	0.00
Others		10	8.00	80.00
Quiz		0	0.00	0.00
Final Exams		1	10.00	10.00
Home work project		0	0.00	0.00
Total Work Load				174.00
Final Exam		1	100.00	
Total work load/ 30 hr		1		5.80
Total		1	100.00	
ECTS Credit of the Course				6.00
Contribution of Term (Year) Learning Activities to Success Grade		0.00		
Contribution of Final Exam to Success Grade		100.00		
Total		100.00		
Measurement and Evaluation Techniques Used in the Course				
24	ECTS / WORK LOAD TABLE			

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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	5	5	3	3	4	4	1	3	3	3	2	1	0	0	0	0

ÖK2	5	5	5	3	5	5	1	5	4	3	2	1	0	0	0	0
ÖK3	5	5	5	2	4	4	1	5	2	3	2	1	0	0	0	0
ÖK4	5	5	5	3	4	3	1	5	4	4	2	1	0	0	0	0
ÖK5	5	5	5	2	4	3	1	5	4	4	2	1	0	0	0	0
ÖK6	5	5	5	2	5	4	1	5	3	4	2	1	0	0	0	0
ÖK7	5	5	5	2	4	4	1	5	4	4	2	1	0	0	0	0
ÖK8	5	5	5	4	3	4	1	5	4	4	2	1	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			