OPTIMIZATION METHODS

1	Course Title:	OPTIMIZATION METHODS
2	Course Code:	EEM4119
3	Type of Course:	Optional
4	Level of Course:	First Cycle
5	Year of Study:	4
6	Semester:	7
7	ECTS Credits Allocated:	4.00
8	Theoretical (hour/week):	3.00
9	Practice (hour/week):	0.00
10	Laboratory (hour/week):	0
11	Prerequisites:	
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Doç. Dr. NEYİR ÖZCAN SEMERCİ
15	Course Lecturers:	-
16	Contact information of the Course Coordinator:	E-posta:neyir@uludag.edu.tr Tel: (224) 294 06 50 Adres: Elektronik Mühendisliği Bölümü 5. Kat, No:540
17	Website:	
18	Objective of the Course:	The aim of the course is teaching the students frequently used optimization methods in engineering.
19	Contribution of the Course to Professional Development:	Gain the ability to use optimization methods in solving engineering problems.
20	Learning Outcomes:	

		1	Gain the ability to model and solve optimization problems using theoretical and practical knowledge.
		2	Gain the ability to identify, model, and solve optimization problems, the ability to select and apply appropriate analysis and modelling methods for these problems.
		3	Gain the ability to design partly or fully a complex system, process, device or a product meeting specific requirements under realistic constraints and conditions; the ability to apply modern design methods in this context.
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21	Course Content:	

Course Content:	

Week	Theoretical	Practice
1	Fundamental mathematical concepts	
2	Definition and classificaion of optimization problems	

#	Topic	
3	Unconstrained and single variable optimization	
4	Golden section method, Bisection Method	
5	Fibonacci Method, Quadratic Interpolation, Newton Method	
6	Secant Method, Quasi-Newton Yöntemi	
7	Gradient Methods: Steepest Decent, Conjugate Gradient	
8	Linear Programing and constrained optimization: Simplex Method, Big-M Simplex Method	
9	Karmarkar Method, Hungarian Algorithm	
10	Nonlinear Programing	
11	Substitution method, Lagrange Multipliers	
12	Heuristic methods in optimization	
13	Artificial Neural Networks, Genetic Algorithm, Fuzzy Optimization	
14	Swarm Algorithm, Ant Colony Optimisation, Artificial Bee Colony	

22	Textbooks, References and/or Other Materials:	1.Stephen G. Nash, Ariela Sofer, Linear and Nonlinear Programming, McGraw Hill, 1996, ISBN:0-07-114537-0 . 2. E. K. P. Chong and S. H. Zak, An Introduction to Optimization, Fourth edition, Wiley & Sons, 2013.

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	2.00	28.00
Homeworks	2	6.00	12.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	20.00	20.00
Others	0	0.00	0.00
Final Exams	1	20.00	20.00
Total Work Load			122.00
Total work load/ 30 hr			4.07
ECTS Credit of the Course			4.00

Overlapping assessment table:

	K	
Assesment		
Midterm Exam	1	30.00
Quiz	0	0.00
Home work project	2	10.00
Final Exam	1	60.00
Total	4	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Total		100.00

Measurement and Evaluation Techniques Used in the Course	Measurement and evaluation is carried out according to the priciples of Bursa Uludag University Associate and Undergraduate Education Regulation.

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	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications				
Contribution Level:	1 very low	2 low	3 Medium	4 High	5 Very High

LO: Learning Objectives PQ: Program Qualifications				
Contribution Level:	1 very low	2 low	3 Medium	4 High	5 Very High