

HEURISTIC ALGORITHMS

1	Course Title:	HEURISTIC ALGORITHMS	
2	Course Code:	END5123	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	7.50	
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:	Prof. Dr. NURSEL ÖZTÜRK	
15	Course Lecturers:	Doç. Dr. İLKER KÜÇÜKOĞLU Dr. Öğr. Üyesi SEVAL ENE YALÇIN	
16	Contact information of the Course Coordinator:	nursel@uludag.edu.tr +90 224 2942083 Bursa Uludağ Üniversitesi Endüstri Mühendisliği Bölümü	
17	Website:		
18	Objective of the Course:	The objective of this course is to provide students the knowledge of Heuristic Algorithms with engineering applications.	
19	Contribution of the Course to Professional Development:	The contribution of the course to the professional development is to introduce the knowledge and applications about heuristic algorithms, and to provide ability to apply the learned heuristic algorithms.	
20	Learning Outcomes:		
		1	Will be able to have knowledge and understanding of heuristic algorithms
		2	Will be able to solve the engineering problems using the heuristic algorithms.
		3	Will be able to present a heuristic algorithm project
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21	Course Content:		
		Course Content:	
Week	Theoretical	Practice	
1	Introduction to heuristic algorithms		
2	Local search methods		
3	Simulated annealing algorithm		

4	Tabu search algorithm	
5	Tabu search algorithm, application examples	
6	Genetic algorithms	
7	Genetic algorithms	
8	Differential evolution algorithm	
9	Genetic algorithm and Differential evolution algorithm application examples	
10	Particle swarm optimization and application examples	
11	Ant colony algorithms	
12	Adaptation of heuristic algorithms to constrained optimization problems	
13	Parameter tuning and performance analyses for heuristic algorithms	
14	Hybrid and parallel meta-heuristic algorithms	

22	Textbooks, References and/or Other Materials:	<p>Modern Sezgisel Teknikler ve Uygulamaları, Tunçhan Cura, 2008, Papatya Yayıncılık.</p> <p>Yapay Zeka Optimizasyon Algoritmaları, Derviş Karaboğa, 2014, Nobel Yayın.</p> <p>Handbook of Metaheuristics, Michel Gendreau and Jean-Yves Potvin, Springer.</p> <p>Metaheuristics From Design to Implementation, El-Ghazali Talbi, 2009, Wiley.</p> <p>Search and Optimization by Metaheuristics – Techniques and Algorithms Inspired by Nature, Ke-Lin Du and M.N.S Swamy, 2016, Birkhauser.</p> <p>Differential evolution a practical approach to global optimization, Price, K.V., Storn, R.M., Lampinen, J.A., 2005, Springer-Verlag, Berlin Heidelberg.</p> <p>Multidimensional particle swarm optimization for machine learning and pattern recognition. Kiranyaz, S., Ince, T., Gabbouj, M. 2014. Springer-Verlag, New York, USA.</p>
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23	Assesment		
TERM LEARNING ACTIVITIES		NUMBE R	WEIGHT
Midterm Exam		0	0.00
Quiz		0	0.00
Home work-project		3	50.00
Final Exam		1	50.00
Total		4	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00	
Contribution of Final Exam to Success Grade		50.00	
Total		100.00	
Measurement and Evaluation Techniques Used in the Course		Homework, Project, Final Exam	
24	ECTS / WORK LOAD TABLE		

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	10.00	140.00
Homeworks	2	8.00	16.00
Projects	1	25.00	25.00
Field Studies	0	0.00	0.00
Midterm exams	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	2.00	2.00
Total Work Load			225.00
Total work load/ 30 hr			7.50
ECTS Credit of the Course			7.50

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