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
	4	
	5	
	6	
	7	
	8	
	9	
	10	
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:	Modern Sezgisel Teknikler ve Uygulamaları, Tunçhan Cura, 2008, Papatya Yayıncılık. Yapay Zeka Optimizasyon Algoritmaları, Derviş Karaboğa, 2014, Nobel Yayın. Handbook of Metaheuristics, Michel Gendreau and Jean-Yves Potvin, Springer. Metaheuristics From Design to Implementation, El-Ghazali Talbi, 2009, Wiley. Search and Optimization by Metaheuristics – Techniques

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

2005, Springer-Verlag, Berlin Heidelberg.
Multidimensional particle swarm optimization for machine
Gaboujj, M. 2014. Springer-Verlag, New York, USA.

TERM LEARNING ACTIVITIES	**NUMBE**	**WEIGHT**
Midterm Exam	0	0.00
Home work-project	3	50.00
Final Exams	1	50.00
Total	4	100.00

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**

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**