COURSE INFORMATON					
Course Title	Code	Semester	L+P Hour	Credits	ECTS
Heuristic Search Techniques	CSE512	1,2	3	3	10

Prerequisites	

Language of Instruction	English
Course Level	Graduate
Course Type	Elective
Course Coordinator	
Instructors	Assoc.Prof.Dr. Emin Erkan Korkmaz
Assistants	
Goals	The aim of this course is to provide students the knowledege about the basic heuristic search techniques and abilities to apply heuristic search methods on practical problems.
Content	Evolutionary algorithms: genetic algorithms, genetic programming, evolutionary programming, evolutionary strategies, applications of evolutionary algorithms and recent developments in these areas. Hyper-heuristics. Social algorithms (e.g., particle swarm optimization), harmony search, simulated annealing, tabu search and other local search methods.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) Knolwedege about the basic heuristic search methodologies.	3	1,2,3	A,C
2) Ability to use knowledge to formulate, and solve practical problems using heuristic search techniques.	2	1,2,3	A,C

Teaching Methods:	1: Lecture, 2: Question-Answer, 3: Lab, 4: Case-study
Assessment Methods:	A: Testing, B: Experiment, C: Homework, D: Project

COURSE CONTENT		
Week	**Topics**	**Study Materials**
1	Introduction to Heuristic Search Methodologies	Textbook
2	Introduction to Evolutionary Algorithms	Textbook
3	Evolutionary Programming and Evolutionary Strategies	Textbook
4	Genetic Algorithms	Textbook
5	Schema Teorem and Convergence in Genetic Algoritgms	Textbook
6	Genetic Programming	Textbook
7	Applications of Evolutionary Algorithms	Textbook
8	Hyper-Heuristics	Textbook
9	Social Algorithms (e.g., particle swarm optimization)	Textbook
10	Harmony search	Textbook
11	Simulated Annealing	Textbook
12	Tabu Search	Textbook
13	Project Presentations	Textbook
14	Project Presentations	Textbook

RECOMMENDED SOURCES	
Textbook	Heuristic Search: Theory and Applications, Stefan Edelkamp and Stefan Schroedl, Morgan Kaufmann; 1 edition (July 15, 2011)
Additional Resources	

MATERIAL SHARING	
Documents	
Assignments	
Exams	

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Assignment	4	20

Project		1	80
Total			**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE			35
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE			65
Total			**100**

COURSE CATEGORY	Expertise/Field Courses

COURSE'S CONTRIBUTION TO PROGRAM						
No	Program Learning Outcomes	Contribution				
		1	2	3	4	5
1	Knowledge in the advanced computer architecture field					
2	Knowledge in advanced system design for computer engineering					X
3	Knowledge in the theoretical topics of computer science				X	
4	Ability to comprehend, analyse and critique academic publications and conduct scholarly research at the frontiers of computer engineering					
5	Ability and knowledge in the fields of Next-Generation and contemporary computer Networks					

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration	14	3	42
Hours for off-the-classroom study (Pre-study, practice)	14	5	70
Project	1	80	80
Assignment	4	15	60
Final examination	1	3	3
Total Work Load			255
Total Work Load / 25 (h)			10.2
ECTS Credit of the Course			10