



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Optimization Algorithms and Applications							
Course Code		MIS521		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	7	Workload	181 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		This course is a survey of the newer, most common adaptive search methods. This undergraduate course with emphasis on self exploration and research. There will be homework assignments, a quiz, an exam and a project. The homework assignments and the project should be done individually. The project can synthesize multiple techniques or be an in depth exploration of one technique using problems and applications are of the student's choice							
Course Content		The areas of focus will be simulated annealing, genetic algorithms, evolutionary strategies, tabu search, ant colony methods and particle swarm optimization. Other methods will be briefly covered. Both combinatorial and continuous optimization problems will be considered, with emphasis on combinatorics. The main techniques will be introduced, discussed critically and variations presented.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Demonstration, Discussion, Case Study, Project Based Study, Individual Study, Problem Solving					
Name of Lecturer(s)									

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	40
Final Examination	1	60

Recommended or Required Reading

1	Metaheuristics for Hard Optimization: Methods and Case Studies Johann Dréo, Alain Pétrowski (Author), Patrick Siarry (Author), Eric Taillard (Author), A. Chatterjee (Translator)
2	Genetic Algorithms in Search, Optimization and Machine Learning (Goldberg)

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to Optimization
2	Theoretical	Simulated Annealing
3	Theoretical	Introduction to Evolutionary Computation
4	Theoretical	Evolutionary Strategies
5	Theoretical	Quadratic Assignment problem-Short Term Memory
6	Theoretical	Optimization and Machine learning
7	Theoretical	Long term memory-Tabu Search
8	Intermediate Exam	MIDTERM
9	Theoretical	Ant Colony Optimization
10	Theoretical	Particle Swarm Optimization
11	Theoretical	Current Heuristic Applications in Literature
12	Theoretical	Implementing one Optimization Method for a real problem as Project
13	Theoretical	Evaluation of Suggested Project
14	Theoretical	Comparison of The Heuristics According to Project Results
15	Final Exam	FINAL

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	16	1	3	64
Assignment	1	8	5	13
Project	1	0	10	10
Individual Work	16	1	3	64
Midterm Examination	1	1	9	10



Final Examination	1	5	15	20
Total Workload (Hours)				181
[Total Workload (Hours) / 25*] = ECTS				7
*25 hour workload is accepted as 1 ECTS				

Learning Outcomes

1	Gains the knowledge and skills of problem solving by using linear optimization algorithms.
2	Gains the knowledge and skills of problem solving by using nonlinear optimization algorithms.
3	Gains the knowledge and skills of problem solving using discrete optimization algorithms.
4	Learn about flock intelligence
5	Learn about genetic basis algorithms

Programme Outcomes (Management Information Systems Master)

1	Be aware of the different types of information technologies and systems using in business, have enough knowledge to design a suitable system
2	Analyse the needs for an information systems and have control over the processes at the analysis, design and implementation stages of the database that belongs to the system
3	Convey information about current trends and their own studies both verbally and visually ways.
4	Be able to follow current developments in modern business techniques and technologies, especially information technologies
5	Understand the interaction between his department and other relational departments, if necessary make a team, take responsibility and do the works with team.
6	Know the information technologies and systems using in different types of business, if necessary take the system responsibility.
7	Be aware of the social transformation especially in their own field and social, legal and moral responsibilities belongs to other work field.
8	Develop their knowledge to the level of expertise which they learn them in license level.
9	Carry out a work which requires an expertness in their field.
10	Construct and perform an academic work.

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1		4			4
P2		4	4	5	4
P3	4	4	5	5	4
P4	5	4	5	5	5
P5	5	4	5	5	5
P6	5	5	5	5	5
P7	5	5	5	5	5
P8	5	5	4	5	5
P9	5	5	4	5	5
P10	5	4	4	5	5

