AING216 Basic Search Strategies

Department:
Computer Engineering

Program Name: Artificial Intelligence Engineering	**Program Code:** 2L	
Course Number: AING216	**Credits:** 4 Cr	**Year/Semester:** 2025-2026 Spring

Required Course Elective Course (click on and check the appropriate box)

Prerequisite(s):
AING201

Catalog Description:
This course will enable students to learn the basic search algorithms needed to become proficient in artificial intelligence. We can list the basic search strategies of artificial intelligence as follows: Uninformed Search, Informed Search, Heuristics, Admissable Heuristics, Local Search, Metaheuristics and Evolutionary Algorithms. The specified strategies will be explained with detailed real-world examples.

*Credits: (4 / 1 / 0) **4*** *Prerequisites: AING201* *ECTS: 6*
Abbreviated Title: Basic Search Strategies *Category: Area Core Course* *Teaching Language: English*
Keywords: search algorithms

Course Web Page:
http://cmpe.emu.edu.tr/

Textbook(s):

- *Artificial Intelligence: A Modern Approach* by Stuart Russell and Peter Norvig.
- *AI for Games* by Ian Millington and John Funge.

Lab Manual:
NA

Indicative Basic Reading List :

Topics Covered and Class Schedule:
(4 hours of lectures per week)

Week 1-2	**Introduction to basic search strategies in AI: Uninformed and Informed serach methods.**
Week 3-4	**Uninformed Search Algorithms: Examples of uninformed search algorithms include breadth-first search (BFS), depth-first search (DFS), uniform-cost search (UCS), depth-limited search , and iterative deepening depth-first search.**
Week 5-6	**Informed (Heuristic) Search Algorithms: Greedy Best-First Search, A* Algorithm, IDA (Iterative Deepening A)**, Beam Search.**
Week 7-8-9	**Review and Midterm Exams**
Week 10-11	**Heuristics & Local search algorithms in AI.**
Week 12-13	**Metaheuristics-Natural inspired metaheuristics**
Week 14-15	**Hybrid Methods & Performance Metrices**
Week 16-18	**Final Exams**

Laboratory Schedule:
(2 hours of laboratory per week)

Week 3	Lab 1
Week 4	Lab 2
Week 5	Lab 3
Week 6	Lab 4
Week 10	Lab 5
Week 11	Lab 6

Course Learning Outcomes:

At the end of the course, student must be able to

1. possess the mathematical knowledge and skills necessary to the analysis of algorithms:
   Reinforce mathematical fundamentals including techniques for solving summations and recurrences and the asymptotic growth rate of functions.
2. gain insight into algorithmic design and how it is affected by and/or affects algorithmic logic, structure, and performance:
   Apply proof techniques and mathematical concepts to demonstrate the correctness and assess the performance of standard algorithms.
3. demonstrate their ability to carry out a complete algorithmic design process (design, analysis, implementation, results):
   Address problems involving algorithmic design, analysis, and implementation.
4. gain an understanding of certain classes of algorithms, along with models for future algorithmic work:
   Introduce a number of standard algorithms, both classical and modern, as objects for algorithmic analysis.

	Method	No	Percentage
Assessment	Midterm Exam(s)	1	40%
	Lab Work(s)	6	15%
	Final Examination	1	45%

***Attendance is compulsory for this course. If you miss 30% of the total attendance you will get NG.**

Contribution of Course to Criterion 5

Credit Hours for:
Mathematics & Basic Science : 0
Engineering Sciences and Design : 4
General Education : 0

Relationship of Course to Program Outcomes

The course supports achievement of the following program objectives

- I. identify, formulate and solve computer engineering and science problems ...
- VII. apply modern engineering tools and techniques innovatively;
- X. Pursue graduate studies in related fields.

This course is used to assess the following items of Program Outcomes

- e) an ability to identify, formulate, and solve engineering problems, (CLO item 3)
- k) use the techniques, skills, and modern engineering tools necessary for engineering practice, (CLO item 4)

Prepared by: Asst. Prof. Dr. Ahmet Ünveren	**Date Prepared:**18 July 2022