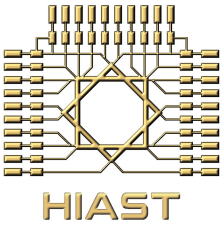
Syrian Arab Republic

Higher Institute for Applied Sciences and Technology



Course Specification Document

Title	Introduction to Artificial Intelligence

Credits	5 ECTS

Aims	This course aims to introduce the student to the fundamental concepts of expert systems and knowledge representation methods. Additionally, the course aims to provide students with various knowledge related to the concepts and fundamentals of expressing preference sets and genetic algorithms, along with their significant applications in the mentioned domains.

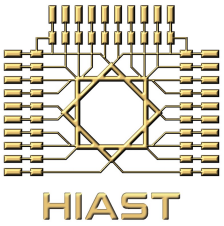
Intended learning outcomes

On successful completion of this course, the student will be able to:

- Understand the fundamental concepts of expert systems and knowledge representation and reasoning methods.
- Familiarize himself with information processing methods using fuzzy logic.
- Identify the software tools used for building systems based on fuzzy logic or genetic algorithms.
- Know the methods for designing a system based on the concept of fuzzy sets and specify its input and output.
- Design expert systems.

Syllabus

- **General introduction:** Evolutionary history of artificial intelligence, intelligent agents, applications of artificial intelligence.
- **Expert systems:** Basic components of expert systems, their importance, and applications.
- **Knowledge representation in expert systems:** Representing problems using propositional calculus and predicate calculus.
- **Inference Methods in expert systems:** Forward chaining and backward chaining.
- **Uncertainty in expert systems and processing techniques:** Certainty factors, Bayesian Reasoning.
- **Introduction to preferential logic:** Overview of preferential logic and the functioning of systems based on it, historical information about preferential logic.
- **Fuzzy sets and membership functions:** Concept of fuzzy sets, concept of membership functions.
- **Operations on fuzzy sets and linguistic variables:** Operations on fuzzy sets, concept of linguistic **variables** and their importance in writing fuzzy rules.



- **Fuzzy rules and ambiguity removal methods:** Fuzzy rules, methods for removing ambiguity in logic-based systems.
- **Introduction to genetic algorithms:** Definition and historical origin of genetic algorithms, basics and applications of genetic algorithms.
- **Gene representation and concepts of selection functions:** Gene representation, concepts of selection functions.
- **Concepts of crossover and mutations:** Concept of crossover and its representation mechanisms, concept of mutation and its representation mechanisms.
- **Practical examples and real applications based on genetic algorithms:** Study and analysis of various advanced problems based on genetic algorithms.