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| Department of Computer Engineering | |
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| **Artificial Intelligence (66417)** | |
| **Total Credits** | **3** |
| **major elective** | |
| **Prerequisites** | P1 : Object Oriented Programming (66212) |

**Course Contents**

This course will introduce the basic principles in the artificial intelligence field. It will cover simple representation schemes, problem solving, and search strategies. Areas of application such as knowledge representation, expert systems, neural network, and fuzzy logic. The Prolog programming language will also be introduced.

| | Intended Learning Outcomes (ILO's) | Student Outcomes (SO's) | Contribution |
|---|---|---|---|
| 1 | To have an understanding of the basic issues of knowledge representation, as well as an understanding of other topics such as problem solving, search strategies, mini-max, and Alpha-Beta pruning. | C | 30 % |
| 2 | To have a basic proficiency in a traditional AI language including an ability to write simple programs and an ability to understand code written in that language. | E | 20 % |
| 3 | To have a basic understanding of some of the more advanced topics of AI such as expert systems, neural network and fuzzy logic. | K | 50 % |

**Textbook and/ or Refrences**

M. Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems, Addison Wesley, Boston.
Russell and Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall.

| Assessment Criteria | Percent (%) |
|---|---|
| First Exam | 15 % |
| Second Exam | 15 % |
| Projects | 20 % |
| Final Exam | 50 % |

**Course Plan**

| Week | Topic |
|---|---|
| 1,2 | 1. Introduction to AI Definitions Goals of AI AI approaches Intelligent agent AI Techniques Applications of AI |
| 3,4 | 2. Problem Solving &Search Strategies Problem representation Example problems Solving problems by searching Uninformed search strategies Informed search strategies |
| 5,6 | 3. Game Playing Mini-Max search procedure Game playing with Mini-Max Alpha-Beta pruning. |
| 7,8 | 4. Rule-Based Expert Systems Rules as a knowledge representation technique The main players in the expert system development team Structure of a rule-based expert system Forward chaining and backward chaining inferencetechniques MEDIA ADVISOR: a demonstration rule-based expert system Conflict resolution Advantages and disadvantages of rule-based expert systems Applications |
| 9-11 | 5. Knowledge Representation General representations Semantic network Extended semantic network PROLOG: simple facts, facts with arguments, order, variables, logical operators, arithmetic operators,rules, search, recursion etc. Building expert systems in |

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| | prolog |
| 12-13 | 6. Fuzzy Expert Systems Introduction, or what is fuzzy thinking? Fuzzy sets Linguistic variables and hedges Operations of fuzzy sets Fuzzy rules Fuzzy inference Building a fuzzy expert system Applications |
| 14-15 | 7. Artificial Neural Networks Introduction, or how the brain works The neuron as a simple computing element The perceptron Multilayer neural networks Accelerated learning in multilayer neural networks Applications |
| 16 | Final |