# Course Specifications

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|---|---|
| **Course Title:** | Artificial Intelligence |
| Course Code: | AI 314 |
| **Program:** | **Information and Computer Science** |
| **Department:** | **Computer Science and Information** |
| **College:** | **Science in AL Zulfi** |
| **Institution:** | **Majmaah University** |

## Table of Contents

## A. Course Identification

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|---|
| **1. Credit hours: 3** |
| **2. Course type**<br>**a.** University ☐ College ☐ Department ☑ Others ☐<br>**b.** Required ☑ Elective ☐ |
| **3. Level/year at which this course is offered: 5th Level** |
| **4. Pre-requisites for this course** (if any)**:**<br>Algorithms and data structures Algorithms and data structures - ICS 223 |
| **5. Co-requisites for this course** (if any)**:**<br>NA |

**6. Mode of Instruction** (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|---|---|---|---|
| 1 | **Traditional classroom** | V | 80 % |
| 2 | **Blended** | 6 | 10 % |
| 3 | **E-learning** | 6 | 10 % |
| 4 | **Correspondence** | | |
| 5 | **Other** | | |

**7. Actual Learning Hours** (based on academic semester)

| No | Activity | Learning Hours |
|---|---|---|
| **Contact Hours** | | |
| 1 | **Lecture** | 30 |
| 2 | **Laboratory/Studio** | 20 |
| 3 | **Tutorial** | 10 |
| 4 | **Others** (Presentations & group discussions) | |
| | **Total** | 60 |
| **Other Learning Hours*** | | |
| 1 | **Study** | 30 |
| 2 | **Assignments** | 30 |
| 3 | **Library** | 20 |
| 4 | **Projects/Research Essays/Theses** | |
| 5 | **Others** (seminars) | 20 |
| | **Total** | 100 |

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

## B. Course Objectives and Learning Outcomes

**1. Course Description**

Artificial intelligence (AI) is the study of solutions for problems that are difficult or impractical to solve with traditional methods. It is used pervasively in support of everyday applications such as email, word-processing and search, as well as in the design and analysis of autonomous

agents that perceive their environment and interact rationally with the environment. The solutions rely on a broad set of general and specialized knowledge representation schemes, problem solving mechanisms and learning techniques. They deal with sensing (e.g., speech recognition, natural language understanding, computer vision), problem-solving (e.g., search, planning), and acting (e.g., robotics) and the architectures needed to support them (e.g., agents, multi-agents). The study of Artificial Intelligence prepares the student to determine when an AI approach is appropriate for a given problem, identify the appropriate representation and reasoning mechanism, and implement and evaluate it.

## 2. Course Main Objective

- Introduce the basic ideas and techniques underlying the design of intelligent computer systems
- Prepare the student to determine when an AI approach is appropriate for a given problem
- Identify the appropriate representation and reasoning mechanism for a given problem
- Study and analyze uninformed and informed search problems
- Understand and build autonomous agents that efficiently make decisions in fully informed, partially observable and adversarial settings
- Understanding how intelligent agent behaves, learns and acts autonomously.

## 3. Course Learning Outcomes

| | CLOs | Aligned PLOs |
|---|---|---|
| 1 | **Knowledge:** | |
| 1.1 | Describe Turing test and the "Chinese Room" thought experiment. | **K3-AI** |
| 1.2 | Differentiate between the concepts of optimal reasoning/behavior and human-like reasoning/behavior. | **K3-AI** |
| 1.3 | Formulate an efficient problem space for a problem expressed in natural language (e.g., English) in terms of initial and goal states, and operators | **K3-AI** |
| 1.4 | Select and implement an appropriate informed search algorithm for a problem by designing the necessary heuristic evaluation function. | **K3-AI** |
| 1.5 | | |
| **2** | **Skills :** | |
| 2.1 | Compare and contrast the most common models used for structured knowledge representation, highlighting their strengths and weaknesses | **S3- AI** |
| 2.2 | Translate a natural language (e.g., English) sentence into predicate logic statement. | **S3- AI** |
| 2.3 | Group works and learning time management | **S3- AI** |
| 2... | | |
| **3** | **Competence:** | |
| 3.1 | List the defining characteristics of an intelligent agent. | **C3-AI** |
| 3.2 | | |
| 3.3 | | |
| 3... | | |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1 | Artificial Intelligence /Fundamental Issues | 4 |
| 2 | Basic Search Strategies | 8 |
| 3 | Basic Knowledge Representation and Reasoning | 8 |
| 4 | Advanced Search | 8 |
| 5 | Advanced Representation and Reasoning | 12 |
| 6 | Reasoning Under Uncertainty | 8 |
| 7 | Intelligent Agents and their Applications | 12 |
| **Total** | | 60 |

## D. Teaching and Assessment

### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Teaching Strategies | Assessment Methods |
|---|---|---|---|
| **1.0** | **Knowledge** | | |
| 1.1 | Formulate an efficient problem space for a problem expressed in natural language (e.g., English) in terms of initial and goal states, and operators | Lectures,<br>Lab demonstrations<br>Case studies<br>Individual presentations | Written Exam<br>Homework assignments<br>Class & lab Activities<br>Quizzes |
| **2.0** | **Skills** | | |
| 2.1 | Compare and contrast the most common models used for structured knowledge representation, highlighting their strengths and weaknesses | Group discussions,<br>Lab demonstrations,<br>Brainstorming<br>Presentations | Home works and assignments |
| **3.0** | **Competence** | | |
| 3.1 | List the defining characteristics of an intelligent agent. | Group discussions,<br>Case Studies,<br>Brainstorming<br>Presentations | Written Exam<br>Homework assignments<br>Class & lab Activities<br>Quizzes |

### 2. Assessment Tasks for Students

| # | Assessment task* | Week Due | Percentage of Total Assessment Score |
|---|---|---|---|
| 1 | First written mid-term exam | 6 | 10% |
| 2 | Second written mid-term exam | 12 | 10% |
| 3 | Presentation, class activities, and group discussion | Every week | 10% |
| 4 | Homework assignments | After Every chapter | 10% |
| 5 | Practical exam | 15 | 20% |
| 6 | Final exam | 16 | 40% |
| | Total | | 100% |
| | | | |

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

**Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :**

Office hours: Sun: 1-3, Mon. 12-1, Wed. 12-1
Office call: Sun. 12-1 and Wed 9-10
Email: y.qawqzeh@mu.edu.sa

## F. Learning Resources and Facilities

### 1.Learning Resources

| | |
|---|---|
| **Required Textbooks** | Artificial Intelligence: With an Introduction to Machine Learning. Richard E. Neapolitan, Xia Jiang (2018). ISBN 9781138502383 |
| **Essential References Materials** | Artificial Intelligence: A Modern Approach. Stuart Russell and Peter Norvig (2009). ISBN-13: 978-0136042594 |
| **Electronic Materials** | http://nptel.ac.in/courses/106105077/<br>http://cs.mcgill.ca/~jpineau/comp424/schedule.html |
| **Other Learning Materials** | Video and presentations that available with the instructor |

### 2. Facilities Required

| Item | Resources |
|---|---|
| **Accommodation**<br>(Classrooms, laboratories, demonstration rooms/labs, etc.) | Classrooms and Laboratories are available at the college of science at Al-Zulfi. |
| **Technology Resources**<br>(AV, data show, Smart Board, software, etc.) | Smart Boards, software, data shows and AV technological resources are available. |

| Item | Resources |
|---|---|
| **Other Resources** (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) | N/A |

## G. Course Quality Evaluation

| Evaluation Areas/Issues | Evaluators | Evaluation Methods |
|---|---|---|
| Student-faculty management meetings. | Program Leaders | Direct |
| Discussion within the staff members teaching the course | Peer Reviewer | Direct |
| Departmental internal review of the course. | Peer Reviewer | Direct |
| Reviewing the final exam questions and a sample of the answers of the students by others. | Peer Reviewer | Direct |
| Visiting the other institutions that introduce the same course one time per semester. | Faculty | Indirect |
| | | |
| | | |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

| | |
|---|---|
| **Council / Committee** | |
| **Reference No.** | |
| **Date** | |