# Course Specification

— (Bachelor)

| | |
|---|---|
| **Course Title**: **Artificial Intelligence** | |
| **Course Code**:  **CS424** | |
| **Program**: **Computer Science** | |
| **Department**:  **Computer Science** | |
| **College**:  **Computer and Information Sciences** | |
| **Institution**:  **Majmaah University** | |
| **Version**:  **2** | |
| **Last Revision Date**:  **31 May 2023** | |

## Table of Contents

## A. General information about the course:

### 1. Course Identification

| 1. Credit hours: ( 3 ) |
|---|
| 3(3,1,0) |

**2. Course type**

| A. | ☐University | ☐ College | ☒ Department | ☐Track | ☐Others |
|---|---|---|---|---|---|
| B. | ☒ Required | | | ☐Elective | |

**3. Level/year at which this course is offered: ( L8/Y4 )**

**4. Course general Description:**

Artificial intelligence (AI) is a research field that studies how to realize the intelligent human behaviors on a computer. The ultimate goal of AI is to make a computer that can learn, plan, and solve problems autonomously. The main research topics in AI include: problem solving, reasoning, planning, natural language understanding, computer vision, automatic programming, and machine learning, and so on.

**5. Pre-requirements for this course (if any):**

MH121 – Discrete Mathematics

**6. Pre-requirements for this course (if any):**

**7. Course Main Objective(s):**

(a) Equipping students with necessary knowledge and skills required to be successful in building much needed intelligent computer systems based on the solid foundations of Computer Science and Information Technology.
(b) Providing students techniques to develop, maintain, and utilize intelligent systems in many life applications.
(c) Familiarizing students with advanced topics in AI using Lisp and Prolog languages.
(d) Developing creative capacities for the design, implementation, and analysis of computer programs that reason and/or act intelligently
(e) Learning to analyze and experimentally evaluate designs and implementations of the intelligent computer programs.

### 2. Teaching mode (mark all that apply)

| No | Mode of Instruction | Contact Hours | Percentage |
|----|---------------------|---------------|------------|
| 1 | Traditional classroom | 60 | 100% |
| 2 | E-learning | | |
| 3 | Hybrid<br>• Traditional classroom<br>• E-learning | | |
| 4 | Distance learning | | |

## 3. Contact Hours (based on the academic semester)

| No | Activity | Contact Hours |
|----|----------|---------------|
| 1. | **Lectures** | 45 |
| 2. | **Laboratory/Studio** | 15 |
| 3. | **Field** | |
| 4. | **Tutorial** | |
| 5. | **Others (specify)** | |
| **Total** | | 60 |

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|------|--------------------------|-----------------------------------|---------------------|--------------------|
| **1.0** | **Knowledge and understanding** | | | |
| 1.1 | | | | |
| 1.2 | | | | |
| ... | | | | |
| **2.0** | **Skills** | | | |
| 2.1 | Students learn how to design, implement and evaluate an AI algorithm and write the program for the same. | S2 | Mini Project, Lab Exercises | Lab Based Assignments, Mini Project |
| 2.2 | Students apply science theory and software development to find a solution of practical problem. | S4 [CS] | Mini Project, Lab Exercises | Lab project |

| Code | Course Learning Outcomes | Code of CLOs aligned with program | Teaching Strategies | Assessment Methods |
|---|---|---|---|---|
| 2.3 | Students learn how to apply knowledge of computing to find the best solution to a certain problem. | S5 | Classroom Teaching | Midterm Exam, Final Exam |
| **3.0** | **Values, autonomy, and responsibility** | | | |
| 3.1 | Students will learn how to build and run an intelligent agent using specific hardware and software programming tools as a team. | V1 | Mini Project, Lab Exercises | Oral Exam |

## C. Course Content

| No | List of Topics | Contact Hours |
|---|---|---|
| 1. | Introduction: Definitions, History of AI | 4 |
| 2. | Intelligent Agents | 8 |
| 3. | Problem Solving by Searching | 12 |
| 4. | Informed Search and Exploration | 8 |
| 5. | Constraint Programming | 4 |
| 6. | Knowledge Representation & Reasoning | 4 |
| 7. | Games & First Order Logic | 4 |
| 8. | Inference | 8 |
| 9. | Machine Learning | 8 |
| **Total** | | **60** |

## D. Students Assessment Activities

| No | Assessment Activities * | Assessment timing (in week no) | Percentage of Total Assessment Score |
|---|---|---|---|
| 1. | Exam 1 | 8 | 20% |
| 2. | Exam 2 | 13 | 20% |
| 3. | Lab Project | 15 | 20% |
| 4. | Final Exam | 16 | 40% |

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

## E. Learning Resources and Facilities

### 1. References and Learning Resources

| | |
|---|---|
| **Essential References** | S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall; 3rd ed. (2009). ISBN-10: 0136042597, ISBN-13: 978-0136042594 |
| **Supportive References** | |
| **Electronic Materials** | |
| **Other Learning Materials** | |

### 2. Required Facilities and equipment

| Items | Resources |
|---|---|
| **facilities** (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.) | Classroom, lab, robots, PCs |
| **Technology equipment** (projector, smart board, software) | Data show |
| **Other equipment** (depending on the nature of the specialty) | - |

## F. Assessment of Course Quality

| Assessment Areas/Issues | Assessor | Assessment Methods |
|---|---|---|
| Effectiveness of teaching | Students | Indirect |
| Effectiveness of Students assessment | Instructor | Direct |
| Quality of learning resources | Instructor | Direct |
| The extent to which CLOs have been achieved | Instructor | Direct/Indirec |
| Other | | |

**Assessors** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval

| | |
|---|---|
| **COUNCIL /COMMITTEE** | COMPUTER SCIENCE DEPARTMENT |
| **REFERENCE NO.** | |
| **DATE** | |