



# Course Specification

## (Postgraduate Programs)

<b>Course Title</b>	Applications of Artificial Intelligence
<b>Course Code:</b>	MSCS 625
<b>Program:</b>	Master Programme in Computer Science
<b>Department:</b>	Computer Science
<b>College:</b>	Computer Science and Information Technology
<b>Institution:</b>	King Faisal University
<b>Version:</b>	Course Specification Version Number
<b>Last Revision Date:</b>	Pick Revision Date.

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## A. General information about the course:

### 1. Course Identification:

1. Credit hours: 3 (3-0-6)

#### 2. Course type

A. ☐ University ☒ College ☐ Department ☐ Track  
B. ☐ Required ☒ Elective

3. Level/year at which this course is offered: : Level 2 , 3 or 4

#### 4. Course General Description:

Artificial Intelligence (AI) spans a wide variety of topics at the forefront of computer science research, including areas like machine learning, robotics, planning, computer vision, natural language processing, and many others. This course serves as a broad introduction to many of these topics, but taught at the graduate level, where students will delve into specific algorithms and applications in significant detail. The course is ideal for students who already studied AI in the undergraduate level; however, this is not mandatory since the course starts from covering the fundamentals of AI and Intelligent agents. In more details, this course examines goals, problems, concepts and methods of artificial intelligence, heuristic versus algorithmic methods. It looks into techniques to solve complex problems in a particular domain, typically independent of knowledge used to direct the search for an optimal solution. Approaches may include beam search, simulated annealing, genetic algorithms, etc. The course covers modern techniques for computers to represent task-relevant information and make intelligent decisions towards the achievement of goals. In addition, the course provides a broad introduction to artificial neural networks and other learning tools to be used for solving problems that are difficult or impractical to solve with other methods, such as: speech and language processing, computer vision, multi-agents systems, speech recognition, neural and evolutionary computation, planning systems, perception and robotics. These tools capabilities are covered by a broad set of general and specialized knowledge representations and reasoning mechanisms. After the course, the student has to be able to distinguish when an AI approach is appropriate for a given problem, and to be able to select and implement a suitable AI method

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

NA

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

NA

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



The main purpose of the course is to serve as a broad introduction to many of topics of artificial intelligence, but taught at the graduate level, where students will delve into specific algorithms and applications in significant detail.

## 2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom		
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>Traditional classroom</li> <li>E-learning</li> </ul>	45	100%
4	Distance learning		

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

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

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

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Distinguish and use different techniques of machines learning	K1	Lectures	- Quizzes - Exams - Assignments
1.2	Understand and differentiate between different concepts of machine learning	K1	Lectures	- Quizzes - Exams - Assignments
2.0	Skills			





Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	Evaluate learning algorithms and compare with alternative techniques	S1, S2	- Lectures	- Quizzes - Exams - Assignments
3.0	Values, autonomy, and responsibility			
3.1	Implement machine learning algorithms on simulated and real world problems	V1	- Lectures - Case studies - Research assignment	Project Report and Presentation
...				

### C. Course Content:

No	List of Topics	Contact Hours
1	Introduction to AI	3
2	Fundamentals of Agents	3
3	Uniformed and Informed Search	3
4	Local Search and Computational Game	3
5	Constraint Satisfaction Problem	3
6	Probabilistic Modeling, Bayesian Networks	3
7	Machine Learning	3
8	Artificial Neural Networks-I	3
9	Artificial Neural Networks-II	3
10	Computer Vision	3
11	Natural Language Processing	6
12	Reinforcement Learning and Robotics	6
13	New Trends in AI Research	3
Total		45

### D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Assignments	Continuous	10%
2.	Quiz	Continuous	10%
3.	Mid Term	8 <sup>th</sup> - 9 <sup>th</sup>	25%





No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4	Capstone Project	15 <sup>th</sup>	15%
5	Final Exam	16 <sup>th</sup> - 17 <sup>th</sup>	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:

Required Textbook	Stuart Russell, Peter Norvig, "Artificial Intelligence: A Modern Approach ", Prentice Hall, 3rd Edition, 2009, ISBN: 0131038052.
Essential References	Kevin Warwick," Artificial Intelligence: The Basics", Routledge; 1st Edition 2011, ISBN: 0415564832.
Supportive References	
Electronic Materials	A lot of online courses, papers and tutorials
Other Learning Materials	Research Papers in the field of Machine Learning that published in international conferences and journals.

### 2. Educational and Research Facilities and Equipment Required:

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Sufficient seats (typically 20) as per student registration required in the lecture
<b>Technology equipment</b> (Projector, smart board, software)	Sufficient computer terminals with required setup having the necessary software installed and configured for the students to complete assignments and projects. Data show is needed to demonstrate in the class
<b>Other equipment</b> (Depending on the nature of the specialty)	Not Required

## F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Indirect Assessment through Teaching Evaluation
Effectiveness of students' assessment	Faculty	Indirect assessment through Course Evaluation Survey



Assessment Areas/Issues	Assessor	Assessment Methods
Quality of learning resources	Students	Indirect Assessment through Learning Resources Survey
The extent to which CLOs have been achieved	Faculty	Direct assessment through Rubrics analyses
Other		

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

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval Data:

COUNCIL /COMMITTEE	
REFERENCE NO.	
DATE	