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|----------------------------------------|--------------------------------------------------------|---------------------------------------------|
| <b>Form:</b><br><b>Course Syllabus</b> | <b>Form Number</b>                                     |                                             |
|                                        | <b>Issue Number and Date</b>                           | <u>2/3/24/2022/2963</u><br><u>5/12/2022</u> |
|                                        | <b>Number and Date of Revision or Modification</b>     |                                             |
|                                        | <b>Deans Council Approval Decision Number</b>          |                                             |
|                                        | <b>The Date of the Deans Council Approval Decision</b> |                                             |
|                                        | <b>Number of Pages</b>                                 | 08                                          |

|     |                                                      |                                                                                                                                                                                                |  |
|-----|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 1.  | Course title                                         | Introduction to Artificial Intelligence                                                                                                                                                        |  |
| 2.  | Course number                                        | 1912240                                                                                                                                                                                        |  |
| 3.  | Credit hours                                         | 3 Credit Hours                                                                                                                                                                                 |  |
|     | Contact hours (theory, practical)                    | 3 theory                                                                                                                                                                                       |  |
| 4.  | Prerequisites/co-requisites                          | Introduction to Artificial Intelligence                                                                                                                                                        |  |
| 5.  | Program title                                        | Artificial Intelligence                                                                                                                                                                        |  |
| 6.  | Program code                                         | 5                                                                                                                                                                                              |  |
| 7.  | Awarding institution                                 | The university of Jordan                                                                                                                                                                       |  |
| 8.  | School                                               | King Abdullah II School for Information Technology                                                                                                                                             |  |
| 9.  | Department                                           | Artificial Intelligence Department                                                                                                                                                             |  |
| 10. | Course level                                         | Undergraduate                                                                                                                                                                                  |  |
| 11. | Year of study and semester (s)                       | Fall 2023/2024                                                                                                                                                                                 |  |
| 12. | Other department (s) involved in teaching the course | None                                                                                                                                                                                           |  |
| 13. | Main teaching language                               | English                                                                                                                                                                                        |  |
| 14. | Delivery method                                      | <input checked="" type="checkbox"/> Face to face learning <input type="checkbox"/> Blended <input type="checkbox"/> Fully online                                                               |  |
| 15. | Online platforms(s)                                  | <input checked="" type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom<br><input type="checkbox"/> Others |  |
| 16. | Issuing/Revision Date                                | October, 2023                                                                                                                                                                                  |  |

**17. Course Coordinator:**

Name: Nadim Obeid

Contact hours:

Sundays, Tuesdays, Thursdays; 8:30-9:30

Office number: 207

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**18. Other instructors:**

Name:

Office number:

Phone number:

Email:

Contact hours:

**19. Course Description:**

Introduction to many primary concepts in artificial intelligence such as reasoning, learning, planning, perception and uncertainty management. Subjects covered in the this course include: Knowledge Representation (simple logic), Planning and Reasoning (Logical agents), Expert Systems (production systems), Machine Learning and Data Mining (K-means clustering, nearest neighbor classification, Decision trees, Naive Bayesian).

**20. Course aims and outcomes:****A- Aims:**

The aim of the course is to bring to the awareness of students the different research areas and aspects of artificial intelligence. students will be shown (1) how to express knowledge of a simple domain in first order predicate calculus and to solve problems using explicit knowledge and reasoning, and how to develop an expert system. Students will be familiarized with the notions of search and planning and reasoning (Logical agents). The students will also be given some grounding in the principal techniques of data mining and be introduced to some applications of data mining. Students will be introduced to some data mining and machine learning techniques (K-means clustering, nearest neighbor classification, Decision trees, Naive Bayesian) to help obtain a clear picture of the concepts of machine learning.

**B- Students Learning Outcomes (SOs):**

Upon successful completion of this course students will be able to

SO(1). Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.

SO(2). Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

On successfully completing the module, the students are expected to have gained good knowledge of:

| Descriptors | ILO/ID | Program SOs                                                                                     | SO (1) | SO (2) |
|-------------|--------|-------------------------------------------------------------------------------------------------|--------|--------|
|             |        | ILOs of the course                                                                              |        |        |
| Knowledge   | A1     | Understand simple logic, planning and principles of reasoning,                                  |        |        |
|             | A2     | Understand production systems, rule-based systems and the basic architecture of expert systems. |        |        |
|             | A3     | Understand the principal techniques of data mining and Machine learning .                       |        |        |
| Skills      | B1     | Demonstrate the ability to recognize the subtleties related to different AI techniques          |        |        |
|             | B2     | Demonstrate the ability to recognize the subtleties related to different approaches to AI       |        |        |
|             | B3     | Design and implement a solution to a problem using AI techniques.                               |        |        |
|             |        |                                                                                                 |        |        |
| Competence  | C1     | Demonstrate competency in applying appropriate AI Techniques to solve a simple problem          |        |        |
|             | C2     | Demonstrate competency in applying appropriate data mining and machine learning techniques      |        |        |
|             | C3     |                                                                                                 |        |        |

**21. Topic Outline and Schedule:**



| Week | Lecture | Topic                                                                                                         | ILO | Learning Methods (Face to Face/Blended/ Fully Online) | Platform     | Synchronous / Asynchronous Lecturing | Evaluation Methods | Resources                |
|------|---------|---------------------------------------------------------------------------------------------------------------|-----|-------------------------------------------------------|--------------|--------------------------------------|--------------------|--------------------------|
| 1    | 1.1     | Introduction to artificial intelligence (Contributing Disciplines, concepts, research areas and applications) | A1  | Face to Face                                          | Moodle Teams | Synchronous                          | Exams              | E-learning portal + Book |
|      | 1.2     | Introduction to artificial intelligence (Contributing Disciplines, concepts, research areas and applications) | A1  | Face to Face                                          | Moodle Teams | Synchronous                          | Exams              | E-learning portal +      |
|      | 1.3     | Introduction to artificial intelligence (Contributing Disciplines, concepts, research areas and applications) | A1  | Online                                                | Moodle Teams | Synchronous                          | Exams              | Book                     |
| 2    | 2.1     | Introduction to artificial intelligence (Contributing Disciplines, concepts, research areas and applications) | A1  | Face to Face                                          | Moodle Teams | Synchronous                          | Exams              | E-learning portal +      |
|      | 2.2     | Introduction to artificial intelligence (Contributing Disciplines, concepts, research areas and applications) | A1  | Face to Face                                          | Moodle Teams | Synchronous                          | Exams              | Book                     |
|      | 2.3     | Introduction to artificial intelligence (Contributing Disciplines, concepts, research areas and applications) | A1  | Online                                                | Moodle Teams | Synchronous                          | Exams              | E-learning portal +      |
| 3    | 3.1     | Knowledge representation, first order predicate logic, Logical agents and Planning)                           | A1  | Face to Face                                          | Moodle Teams | Synchronous                          | Exams              | Book                     |



|   |     |                                                   |            |              |              |             |                    |                     |
|---|-----|---------------------------------------------------|------------|--------------|--------------|-------------|--------------------|---------------------|
| 4 | 3.2 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Face to Face | Moodle Teams | Synchronous | Exams              | E-learning portal + |
|   | 3.3 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Online       | Moodle Teams | Synchronous | Exams              | Book                |
|   | 4.1 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Face to Face | Moodle Teams | Synchronous | Homework, Exams    | E-learning portal + |
| 5 | 4.2 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Face to Face | Moodle Teams | Synchronous | Homework, Exams    | Book                |
|   | 4.3 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Online       | Moodle Teams | Synchronous | Homework, Exams    | E-learning portal + |
|   | 5.1 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Face to Face | Moodle Teams | Synchronous | Exams              | Book                |
| 6 | 5.2 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Face to Face | Moodle Teams | Synchronous | Exams              | E-learning portal + |
|   | 5.3 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Online       | Moodle Teams | Synchronous | Exams              | Book                |
|   | 6.1 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Face to Face | Moodle Teams | Synchronous | Exams              | E-learning portal + |
| 7 | 6.2 | Logic, Logical agents, reasoning and Planning     | A1, B1, C1 | Face to Face | Moodle Teams | Synchronous | Exams              | Book                |
|   | 6.3 | Production systems, rule based and expert systems | A2, B2, C1 | Online       | Moodle Teams | Synchronous | Exams              | E-learning portal + |
|   | 7.1 | Production systems, rule based and expert systems | A2, B2, C1 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |
| 8 | 7.2 | Production systems, rule based and expert systems | A2, B2, C1 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|   | 7.3 | Production systems, rule based and expert systems | A2, B2, C1 | Online       | Moodle Teams | Synchronous | Assignments, Exams | Book                |
|   | 8.1 | Production systems, rule based and expert systems | A2, B2, C1 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|   | 8.2 | Production systems, rule based and expert systems | A2, B2, C1 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |
|   | 8.3 | Production systems, rule based and expert systems | A2, B2, C1 | Online       | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |



|    |      |                                                                      |            |              |              |             |                    |                     |
|----|------|----------------------------------------------------------------------|------------|--------------|--------------|-------------|--------------------|---------------------|
| 9  | 9.1  | Production systems, rule based and expert systems                    | A2, B2, C1 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |
|    | 9.2  | Search and planning                                                  | A2, B3     | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|    | 9.3  | Search and planning                                                  | A2, B3     | Online       | Moodle Teams | Synchronous | Assignments, Exams | Book                |
| 10 | 10.1 | Search and planning                                                  | A2, B3     | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|    | 10.2 | Search and planning                                                  | A2, B3     | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |
|    | 10.3 | Introduction to Data Mining and Machine Learning                     | A3, B1, C2 | Online       | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
| 11 | 11.1 | Introduction to Data Mining and Machine Learning                     | A3, B1, C2 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |
|    | 11.2 | Introduction to Data Mining and Machine Learning                     | A3, B1, C2 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|    | 11.3 | Introduction to Data Mining and Machine Learning                     | A3, B1, C2 | Online       | Moodle Teams | Synchronous | Assignments, Exams | Book                |
| 12 | 12.1 | Introduction to Data Mining and Machine Learning                     | A3, B1, C2 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|    | 12.2 | Introduction to Data Mining and Machine Learning                     | A3, B1, C2 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |
|    | 12.3 | Supervised Learning                                                  | A3, B1, C2 | Online       | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
| 13 | 13.1 | Supervised Learning, decision trees                                  | A3, B1, C2 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |
|    | 13.2 | Supervised Learning, decision trees                                  | A3, B1, C2 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|    | 13.3 | Supervised Learning, decision trees, nearest neighbor classification | A3, B1, C2 | Online       | Moodle Teams | Synchronous | Assignments, Exams | Book                |
| 14 | 14.1 | Supervised Learning, decision trees, nearest neighbor classification | A3, B1, C2 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|    | 14.2 | Unsupervised learning, K-means clustering                            | A3, B1, C2 | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |



|    |      |                                           |           |              |              |             |                    |                     |
|----|------|-------------------------------------------|-----------|--------------|--------------|-------------|--------------------|---------------------|
| 15 | 14.3 | Unsupervised learning, K-means clustering | A3, B1 C2 | Online       | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|    | 15.1 | Central Nervous system and Neural Network | A3        | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | Book                |
|    | 15.2 | Central Nervous system and Neural Network | A3        | Face to Face | Moodle Teams | Synchronous | Assignments, Exams | E-learning portal + |
|    | 15.3 | Central Nervous system and Neural Network | A3        | Online       | Moodle Teams | Synchronous | Assignments, Exams | Book                |

## 22. Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

| Evaluation Activity | Mark | Topic(s)                                | SLOs | Period (Week) | Platform |
|---------------------|------|-----------------------------------------|------|---------------|----------|
| Project             | 20%  | AI Application                          | 1, 2 | Week 14       | Moodle   |
| Mid                 | 30%  | All topics covered in the first 8 weeks | 1,2  | Week 9        | Paper    |
| Final               | 50%  | All topics                              | 1,2  | 120 Minutes   | paper    |
|                     |      |                                         |      |               |          |
|                     |      |                                         |      |               |          |

## 23. Course Requirements

- MS Teams
- Every student should visit the following site for course material and announcements.  
Site address: [elearning.ju.edu.jo](http://elearning.ju.edu.jo)
- MS Office 365

## 24. Course Policies:

### A- Attendance policies:

Maximum allowable absence 15% of number of Lectures/Semester

### B- Absences from exams and handing in assignments on time:

It is the student's responsibility to ensure that he/she is aware of all assignments, announcements and contents of missed sessions

**C- Health and safety procedures:**

Practical sessions need labs which are suitable adjustable chairs, safe computers and wires should be well organized.

**D- Honesty policy regarding cheating, plagiarism, misbehavior:**

It is the student's responsibility to ensure that he/she is adhere with cheating, plagiarism, misbehaviour

**E- Grading policy:****Intended (Tentative) Grading Scale:**

| Range    | LG | الحرف | Range   | LG | الحرف | Range   | LG | الحرف |
|----------|----|-------|---------|----|-------|---------|----|-------|
| 91 - 100 | A  | أ     | 74 - 77 | B- | -ب    | 56 - 60 | D+ | +د    |
| 86 - 89  | A- | -أ    | 70 - 73 | C+ | +ج    | 50 - 55 | D  | د     |
| 82 - 85  | B+ | +ب    | 66 - 69 | C  | ج     | 45 - 49 | D- | -د    |
| 78 - 81  | B  | ب     | 61 - 65 | C- | -ج    | 0 - 44  | F  | هـ    |

**Grading and Evaluation Criteria: 100 points distributed as follows:**

| Weight | Criteria                 | Comments            |
|--------|--------------------------|---------------------|
| 30%    | Midterm Exam (Automated) | TBA (in due course) |
| 20%    | Project                  | TBA (in due course) |
| 50%    | Final Exam               |                     |

**F- Available university services that support achievement in the course:**

Computer Labs.

**25. References:**

A- Russell, S. J., & Norvig, P. (2020). Artificial intelligence: a modern approach. Englewood Cliffs, N.J., Prentice Hall.

B- Recommended books, materials, and media:

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**26. Additional information:**



1. Supplementary notes on each topic are made available of the e-learning (Moodle system).
2. Students are encouraged to make use of JU library, E-LIBRARY:

**Some important/relevant journals include:**

- (1) Artificial Intelligence
- (2) Applied Intelligence
- (3) AI Review

تحريض على هذا الامتناع سوف يؤدي الى حرمان الطالب من المادة المعنية.  
في حالة التغيب عن الامتحانين الأول و الثاني لن يكون هناك امتحان تعويضي الا في حالة وجود عذر وحالة طارئة من المستشفى.  
على الطالب براز العذر لمدرس المادة في فتره لا تتجاوز الثلاثة ايام من تاريخ الامتحان, وللمدرس الحق في قبول او رفض العذر ,  
وحسب التعليمات.

2) Concerns or complaints should be expressed in the first instance to the module lecturer; if no resolution is forthcoming then the issue should be brought to the attention of the module coordinator (for multiple sections) who will take the concerns to the module representative meeting. Thereafter problems are dealt with by the Department Chair and if still unresolved the Dean and then ultimately the Vice President. For the final complaints, there will be a committee to review grading the final exam.

3) Students are encouraged to make heavy use of the library, E-LIBRARY

<http://ezlibrary.ju.edu.jo/login> or from within the university using (<http://e-library>)

4) Students are encouraged to search for articles related to the material contents discussed during this course, using designated sites, like <http://researchGate.com>

- The instructor can make changes to this syllabus when necessary.
- University regulations will be preserved at all times

5) For more details on University regulations please visit <http://www.ju.edu.jo/rules/index.htm>

Name of Course Coordinator: Dr. Dima Suleiman Signature: *Dima Suleiman* Date: October-2023

Head of Curriculum Committee/Department: -----Signature: -----

Head of Department: -----Signature: -----

Head of Curriculum Committee/Faculty: -----Signature: -----

Dean: -----Signature: -----