



# MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية



| Module Information                 |                                |                               |                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| معلومات المادة الدراسية            |                                |                               |                                                                                                                                                                                                                                      |
| Module Title                       | Graduation Project I           |                               | Module Delivery                                                                                                                                                                                                                      |
| Module Type                        | Core                           |                               | <input checked="" type="checkbox"/> Theory<br><input checked="" type="checkbox"/> Practical<br><input checked="" type="checkbox"/> Lecture<br><input checked="" type="checkbox"/> Lab<br><input checked="" type="checkbox"/> Seminar |
| Module Code                        | IT4106                         |                               |                                                                                                                                                                                                                                      |
| ECTS Credits                       | 3                              |                               |                                                                                                                                                                                                                                      |
| SWL (hr/sem)                       | 75                             |                               |                                                                                                                                                                                                                                      |
| Module Level                       | UGIII                          | Semester of Delivery          | 1                                                                                                                                                                                                                                    |
| Administering Department           | Information Technology         | College                       | College of Computer Science and Information Technology                                                                                                                                                                               |
| Module Leader                      | MSc. Ali khudhair              | e-mail                        | <a href="mailto:ali.khudhair.a@uowa.edu.iq">ali.khudhair.a@uowa.edu.iq</a>                                                                                                                                                           |
| Module Leader's Acad. Title        | Asst. Lecture                  | Module Leader's Qualification | MSc                                                                                                                                                                                                                                  |
| Module Tutor                       | Ali Mahmoud Ali                | e-mail                        | <a href="mailto:ali.abdulhussein19@uowa.edu.iq">ali.abdulhussein19@uowa.edu.iq</a>                                                                                                                                                   |
| Peer Reviewer Name                 | Asst. Prof. Dr Haider Mohammed | e-mail                        | <a href="mailto:hayder.alghanami@uowa.edu.iq">hayder.alghanami@uowa.edu.iq</a>                                                                                                                                                       |
| Scientific Committee Approval Date | 01/09/2026                     | Version Number                | V1.0                                                                                                                                                                                                                                 |

| Relation with other Modules       |   |          |   |
|-----------------------------------|---|----------|---|
| العلاقة مع المواد الدراسية الأخرى |   |          |   |
| Prerequisite module               | - | Semester | - |
| Co-requisites module              | - | Semester | - |



Department Head Approval

Dean of the College Approval

## Module Aims, Learning Outcomes and Indicative Contents

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Aims</b>              | <ol style="list-style-type: none"> <li>1. Provide students with a solid and comprehensive understanding of the fundamentals, theories, and techniques of Artificial Intelligence (AI).</li> <li>2. Develop practical skills that enable students to apply AI methodologies to solve real-world problems effectively.</li> <li>3. Enhance students' programming abilities and strengthen their familiarity with AI-related programming languages.</li> <li>4. Foster critical thinking and analytical skills in evaluating AI algorithms, methods, and models.</li> <li>5. Promote teamwork, communication, and collaboration through group-based AI projects.</li> <li>6. Encourage continuous learning and staying updated with current advancements and emerging trends in the field of AI.</li> </ol>                                                                                                                                                   |
| <b>Module Learning Outcomes</b> | <p>Upon successful completion of this module, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Identify and describe different types of intelligent agents and their characteristics.</li> <li>2. Recognize and evaluate the characteristics, strengths, and effectiveness of various AI algorithms.</li> <li>3. Apply and compare multiple knowledge representation techniques across different scenarios.</li> <li>4. Formulate real-world problems creatively and translate them into AI-based problem representations.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Indicative Contents</b>      | <ol style="list-style-type: none"> <li>1. Artificial Intelligence and Intelligent Agents:<br/>Overview of AI, the Turing Test, types of agents, agent environments, and agent architectures.</li> <li>2. Problem Solving by Searching:<br/>State-space representation, uninformed search strategies, heuristic search, A* algorithm, local search, and search with partial observations.</li> <li>3. Adversarial Search Algorithms:<br/>Optimal decision-making in competitive environments, Alpha-Beta pruning, stochastic games, and partially observable game strategies.</li> <li>4. Constraint Satisfaction Problems (CSPs):<br/>Definitions of CSPs, constraint propagation, arc consistency, and local search for CSPs.</li> <li>5. Knowledge Representation and Reasoning:<br/>Propositional logic, theorem proving, logic-based agents, first-order logic, forward and backward chaining, expert systems, and probabilistic reasoning.</li> </ol> |

## Learning and Teaching Strategies

### Strategies

A variety of teaching and learning activities will be used, including:

- **Lectures** to introduce theoretical concepts related to intelligent agents, AI algorithms, knowledge representation, and computational intelligence.
- **Laboratory sessions** to practice implementing AI algorithms and developing intelligent software using programming tools.
- **Group projects** where students analyze real-world problems and formulate them as AI problems.
- **Presentations and discussions** to enhance communication, collaboration, and analytical thinking skills.

| Student Workload (SWL)   |                     |                        |   |
|--------------------------|---------------------|------------------------|---|
| Structured SWL (h/sem)   | 65                  | Structured SWL (h/w)   | 5 |
| Unstructured SWL (h/sem) | 85                  | Unstructured SWL (h/w) | 6 |
| Total SWL (h/sem)        | 147 + 3 final = 150 |                        |   |

| Module Evaluation    |                     |             |                  |             |                           |
|----------------------|---------------------|-------------|------------------|-------------|---------------------------|
|                      |                     | Time/Number | Weight (Marks)   | Week Due    | Relevant Learning Outcome |
| Formative assessment | Quizzes             | 10          | 10% (10)         | 2,4,6,8,10  | 1,2,3,4                   |
|                      | Homework assignment | 5           | 5% (5)           | 2,5,8,9,12  | All                       |
|                      | Onsite Assignments  | 5           | 5% (5)           | 3,5,8,10,11 | All                       |
|                      | Projects            | 1           | 10%(10)          | 12          | All                       |
|                      | Lab                 | 10          | 10%(10)          | 3,5,7,9,12  | All                       |
| Summative assessment | Midterm Exam        | 2hr         | 10% (10)         | 7           |                           |
|                      | Final Exam          | 3hr         | 50% (50)         | 16          |                           |
| Total assessment     |                     |             | 100% (100 Marks) |             |                           |

## Delivery Plan (Weekly Syllabus)

|         | Material Covered                             |
|---------|----------------------------------------------|
| Week 1  | Introduction to Artificial Intelligence      |
| Week 2  | Fundamentals of Artificial Intelligence      |
| Week 3  | Problem Solving by Searching                 |
| Week 4  | Search Algorithms                            |
| Week 5  | Heuristic Search Techniques                  |
| Week 6  | Adversarial Search Algorithms                |
| Week 7  | Breadth-First Search                         |
| Week 8  | Depth-First Search                           |
| Week 9  | Midterm Examination                          |
| Week 10 | Constraint Satisfaction Problems             |
| Week 11 | Forward Checking and Constraint Propagation  |
| Week 12 | Arc Consistency and Constrained Optimization |
| Week 13 | Knowledge Representation and Reasoning       |
| Week 14 | Logic-Based Knowledge Representation         |
| Week 15 | Reasoning Methods and Inference Engines      |
| Week 16 | Preparatory Week before the Final Exam       |

## Delivery Plan (Weekly Lab. Syllabus)

|                | Material Covered                                                             |
|----------------|------------------------------------------------------------------------------|
| <b>Week 1</b>  | Introduction to Python Programming (Data Types) – Tic Tac Toe implementation |
| <b>Week 2</b>  | Implementing examples of AI and various environments                         |
| <b>Week 3</b>  | Building a simple Agent-Based Model in Python                                |
| <b>Week 4</b>  | Graph representation and visualization in Python                             |
| <b>Week 5</b>  | Search Algorithms – Uninformed search                                        |
| <b>Week 6</b>  | Search Algorithms – Informed search                                          |
| <b>Week 7</b>  | Solving the Eight-Puzzle problem in Python                                   |
| <b>Week 8</b>  | Practical Discussion I – Small project                                       |
| <b>Week 9</b>  | Constraint Satisfaction Problems (CSP)                                       |
| <b>Week 10</b> | Knowledge Representation in Python                                           |
| <b>Week 11</b> | Map Coloring Problem                                                         |
| <b>Week 12</b> | N-Queen and Sudoku Problems                                                  |
| <b>Week 13</b> | Knowledge Representation using Propositional Logic in Python                 |
| <b>Week 14</b> | Knowledge Representation using First-Order Logic in Python                   |
| <b>Week 15</b> | Practical Discussion II – Small project                                      |

## Learning and Teaching Resources

|                          | Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Available in the Library? |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Required Texts</b>    | <p>Russell, Stuart J., and Norvig, Peter. Artificial Intelligence : A Modern Approach. 4th Edition. Prentice Hall Series in Artificial Intelligence. Upper Saddle River, N.J.: Prentice Hall, 2021.</p> <p>1. Padhy, N. P. (2005). Artificial Intelligence and Intelligent Systems. New Delhi: Oxford University Press. 2. D. L. Poole and A. K. Mackworth, "Artificial Intelligence: Foundations of Computational Agents." Cambridge University Press, 2017. 3. G. F. Luger, "Artificial Intelligence: Structures and Strategies for Complex Problem Solving." Pearson, 2019. 4. M. Negnevitsky, "Artificial Intelligence: A Systems Approach." Pearson, 2019.</p>                                                                                                | Yes                       |
| <b>Recommended Texts</b> | <p>1. Padhy, N. P. (2005). Artificial Intelligence and Intelligent Systems. New Delhi: Oxford University Press. 2. D. L. Poole and A. K. Mackworth, "Artificial Intelligence: Foundations of Computational Agents." Cambridge University Press, 2017. 3. G. F. Luger, "Artificial Intelligence: Structures and Strategies for Complex Problem Solving." Pearson, 2019. 4. M. Negnevitsky, "Artificial Intelligence: A Systems Approach." Pearson, 2019.</p> <p><a href="http://www.sqlcourse.com">http://www.sqlcourse.com</a></p> <p><a href="https://www.tutorialspoint.com/human_computer_interface/index.htm">https://www.tutorialspoint.com/human_computer_interface/index.htm</a></p> <p><a href="https://www.hci-book.com">https://www.hci-book.com</a></p> |                           |

## Grading Scheme

| Group                               | Grade                   | Mark              | Marks (%) | Definition                            |
|-------------------------------------|-------------------------|-------------------|-----------|---------------------------------------|
| <b>Success Group<br/>(50 - 100)</b> | <b>A</b> - Excellent    | Excellent         | 90 - 100  | Outstanding Performance               |
|                                     | <b>B</b> - Very Good    | Very Good         | 80 - 89   | Above average with some errors        |
|                                     | <b>C</b> - Good         | Good              | 70 - 79   | Sound work with notable errors        |
|                                     | <b>D</b> - Satisfactory | Fair / Average    | 60 - 69   | Fair but with major shortcomings      |
|                                     | <b>E</b> - Sufficient   | Pass / Acceptable | 50 - 59   | Work meets minimum criteria           |
| <b>Fail Group<br/>(0 – 49)</b>      | <b>FX</b> – Fail        | Fail (Pending)    | (45-49)   | More work required but credit awarded |
|                                     | <b>F</b> – Fail         | Fail              | (0-44)    | Considerable amount of work required  |
|                                     |                         |                   |           |                                       |

**Note:** Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.