<table>
<tr><td>Course Title</td><td colspan="5">Artificial Intelligence</td></tr>
<tr><td>Course Code</td><td colspan="5">ACSC368</td></tr>
<tr><td>Course Type</td><td colspan="5">For BSc Computer Engineering, BSc Computer Science: Compulsory
For BSc Electrical Engineering: Technical Elective</td></tr>
<tr><td>Level</td><td colspan="5">BSc (Level 1)</td></tr>
<tr><td>Year / Semester</td><td colspan="5">3rd, 6th (Spring)</td></tr>
<tr><td>Teacher’s Name</td><td colspan="5">Harris Papadopoulos</td></tr>
<tr><td>ECTS</td><td>6</td><td>Lectures / week</td><td>3</td><td>Laboratories/week</td><td>0</td></tr>
<tr><td>Course Purpose</td><td colspan="5">The aim of this course is to introduce students to the fundamental concepts of Artificial Intelligence. It examines and analyses the main techniques and theories developed in some of the major areas of the field such as problem solving by searching, local search and optimization, adversarial search and logical agents.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="5">1. Identify and describe some of the main areas that comprise the field of Artificial Intelligence and discuss the practical application of Artificial Intelligence techniques in computer systems.
2. Describe and explain the fundamental concepts behind some of the most important Artificial Intelligence algorithms.
3. Analyze and propose ways of dealing with the main issues involved in various areas of Artificial Intelligence.
4. Formulate and assess problems in Artificial Intelligence.
5. Demonstrate and explain the execution of some of the most important Artificial Intelligence algorithms.
6. Analyse, evaluate and compare the suitability of different Artificial Intelligence techniques for given problems.</td></tr>
<tr><td>Prerequisites</td><td colspan="2">None</td><td colspan="2">Corequisites</td><td>None</td></tr>
<tr><td>Course Content</td><td colspan="5">• Introduction to Artificial Intelligence: What is Artificial Intelligence; The Turing test; History of Artificial Intelligence; The state of the art.
• Intelligent Agents: Agents and environments; The concept of rationality; Task environment specification and characteristics; Agent structures; Agent programs; Simple reflex agents; Model-based agents; Goal-based agents; Utility-based agents; Learning agents.
• Solving Problems by Searching: Problem-solving agents; Formulating problems; Example toy and real world problems; Measuring problem-solving performance; Breadth-first search; Uniform-cost search; Depth-first search; Depth-limited search; Iterative</td></tr>
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	deepening search; Uninformed search comparison; Avoiding repeated states. • **Informed Search Strategies:** Greedy best-first search; A* search; Admissible heuristics and optimality of A* search; Heuristic functions; The effect of heuristic accuracy on performance; Inventing admissible heuristic functions. • **Local Search Algorithms and Optimization Problems:** Local search problem formulation; State space landscape; Hill-climbing search; Simulated annealing search; Local beam search; Genetic algorithms. • **Adversarial Search:** Optimal decisions in Games; Optimal strategies; The minimax algorithm; Alpha-beta pruning; Evaluation functions and cutting off search; Games with chances; The expectiminimax algorithm; Complexity of expectiminimax. • **Logical Agents:** Knowledge-based agents; Logic; Propositional logic; Syntax and semantics of propositional logic; Inference; Equivalence, validity and satisfiability; Reasoning patterns in propositional logic; Resolution; Forward and backward chaining; Propositional inference; Agents based on propositional logic.
Teaching Methodology	The course is delivered through three hours of lectures per week, which include presentation of new material and demonstration of concepts. Lectures also include in-class exercises to enhance the material learning process and to assess the student level of understanding and provide feedback accordingly. All lecture notes and other material is available to students through the course homepage.
Bibliography	**(a) <u>Textbook:</u>** • Stuart J. Russel and Peter Norvig, ***Artificial Intelligence: A Modern Approach***, 3rd Edition, Prentice Hall, 2009. **(b) <u>References:</u>** • George F. Luger, ***Artificial Intelligence: Structures and Strategies for Complex Problem Solving***, 6th Edition, Addison Wesley, 2009. • Ivan Bratko, ***Prolog-Programming for Artificial Intelligence***, 3rd Edition, Addison Wesley, 2001.
Assessment	The Students are assessed via continuous assessment throughout the duration of the Semester, which forms the Coursework grade and the final written exam. The coursework and the final exam grades are weighted 40% and 60%, respectively, and compose the final grade of the course. Various approaches are used for the continuous assessment of the students, such as class participation and in class exercises, assignments and tests. The assessment weight, date and time of each type of continuous assessment is being set at the beginning of the semester via the course outline. An indicative weighted continuous assessment of the course is shown below:

	• Participation Activities (4% of total marks for module) • Three assignments (20% of total marks for module) • One closed-book test (16% of total marks for module) • One closed-book, 2-hour exam (60% of total marks for module) Students are prepared for final exam, by revision on the matter taught, problem solving and concept testing and are also trained to be able to deal with time constrains and revision timetable. The criteria considered for the assessment of each type of the continuous assessment and the final exam of the course are: (i) the comprehension of the fundamental concepts and theory of each topic, (ii) the application of the theory in solving related problems and (iii) the ability to apply the above knowledge in complex real-life problems. The final assessment of the students is formative and summative and is assured to comply with the subject's expected learning outcomes and the quality of the course.
Language	**English**