Subject Description Form

Subject Code	COMP 5511
Subject Title	Artificial Intelligence Concepts
Credit Value	3
Level	5
Pre-requisite/Exclusion	Nil
Objectives	This subject aims to introduce the main concepts, ideas and techniques of artificial intelligence (AI) to the students so that they could know the various aspects of AI, understand some essential principles and are able to implement some basic AI techniques in their projects or other related work.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) use logic programming (e.g. Prolog) to write programs to solve simple AI problems; b) master the basic searching techniques (e.g. breadth first search, depth first search, A search, etc.) for problem solving; c) to know how to represent the knowledge and do reasoning; d) to do reasoning in uncertainty situations; e) know how to use the basic machine learning technique; f) to use artificial neural networks for data classification; and g) know the basic techniques in computer vision and image understanding.
Subject Synopsis/ Indicative Syllabus	• **Logic Programming**: Foundations of logic programming and the PROLOG language. • **Problem Solving and Search Strategies:** Uninformed search and basic heuristic search strategies. • **Knowledge Representation:** Logic Representations, Propositional logic, First order logic, Automated reasoning • **Reasoning in Uncertainty Situations:** Non-monotonicity, Truth maintenance systems, Fuzzy logic, Bayesian reasoning. • **Artificial Neural Networks:** What is ANN? The architectures of ANNs. What can ANN do? How do ANNs learn? • **Symbol based machine Learning:** Version space search, Decision tree, Explanation-based learning, Unsupervised learning. • **Selected Advanced Topics:** Natural Languages Processing, Visual Image Understanding, Pattern Recognition, etc.
Teaching/Learning Methodology	This course explores the core AI concepts. It provides a comprehensive introduction to the problems and techniques of artificial intelligence. Theory and practice are both emphasized. To enhance the understanding of how conceptions and ideas in AI are actually implemented, prolog and expert system shells will be used for programming exercises and projects. Lectures will be supplemented with video sessions to enhance student's learning. A fair portion of guided reading will also be provided.

<table>
<tr><td></td><td>39 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
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<tr><td rowspan="2">Specific Assessment Methods/Tasks</td><td rowspan="2">% weighting</td><td colspan="7">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td></tr>
<tr><td>Assignments, Tests & Projects</td><td>55</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Final Examination</td><td>45</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100</td><td colspan="7"></td></tr>
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<tr><td rowspan="4">Student study effort expected</td><td colspan="2">Class Contact:</td></tr>
<tr><td>Class activities (lecture, tutorial, lab)</td><td>39 hours</td></tr>
<tr><td colspan="2">Other student study effort:</td></tr>
<tr><td>Assignments, Quizzes, Projects, Exams</td><td>65 hours</td></tr>
<tr><td>Reading list and references</td><td colspan="2">(1). Bratko, I., 2001, PROLOG, Programming for Artificial Intelligence, 3rd edition, Addison-Wesley.
(2). Luger, G.F., 2009, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, 6th edition, Addison-Wesley.
(3). Russell, S. and Norvig, P., 2003, Artificial Intelligence - A Modern Approach, 2nd edition, Prentice Hall.

Papers and articles selected from:
Artificial Intelligence
AI Expert
AI Magazine
Applied Intelligence
IEEE Computer
IEEE Intelligent Systems and their Applications
IEEE Trans. Neural Networks</td></tr>
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