

Subject Description Form

Subject Code	COMP 5123
Subject Title	Intelligent Information Systems
Credit Value	3
Level	5
Pre-requisite/Exclusion	Nil
Objectives	This course aims to introduce the principles, concepts, theories and technologies that are developed in the fields of artificial and computational intelligence. How they can be used in the construction of information systems to support management decision making will be taught. By providing specific examples, the subject also aims to enable students to master the techniques for problem solving in various application areas in business and finance, computing and engineering.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a) understand and apply the latest techniques in artificial and computational intelligence that can be used to facilitate decision making processes; b) apply principles and techniques in knowledge management to solve practical business problems; c) design the important components to support the decision making processes in an Executive Support system; d) possess the knowledge to evaluate the different commercially available or public domain tools that can be used to tackle specific problems related to business decision making; and e) possess the ability to understand and decide if future new techniques in artificial and computational intelligence can be used to solve different practical business problems.
Subject Synopsis/ Indicative Syllabus	<ul style="list-style-type: none"> • Introduction, Data, Information and Knowledge: Architecture of an intelligent information systems; decision making and systems; artificial intelligence techniques, concepts of data and information; methods to process data into information in organizations; transaction processing systems; database and knowledge base management. • Expert Systems for Managers: Introduction to expert systems; knowledge engineering; knowledge acquisition; knowledge representation and inference; uncertainty representation and reasoning; verification and validation; applications in business and finance. • Case Based Reasoning: Reasoning using cases, representing cases, indexing and retrieving cases, organizational and retrieval algorithms, case adaptation, case base maintenance, soft computing in case based reasoning, applications and case studies • Data and Text Mining: Data mining and knowledge discovery life cycle, association, classification, clustering and prediction, soft computing in data mining, text mining, information

	<p>extraction and retrieval.</p> <ul style="list-style-type: none"> • Intelligent Decision Support Systems for Business Intelligence: Computational intelligence techniques; genetic algorithms for organizational modeling; neural networks and fuzzy logic for business applications; hybrid systems; integration of expert systems and neural networks; integrated intelligent systems. • Fuzzy Information Systems: Classical vs. fuzzy sets; membership functions; predicate vs. fuzzy logic; approximate reasoning; natural language; linguistic hedges; rule-based systems; likelihood and truth qualification; graphical techniques of inference. • Genetic algorithms for management applications: Natural evolution; a simple genetic algorithm; evaluation; population; parent selection; mutation; crossover; the inversion operator; performance enhancement; elitism; steady-state reproduction; robustness; interpolating operator fitness; applications in business, finance and management. • Neural Computation for business and finance: Biological vs. artificial neural networks; single- and multiple-layer perceptron; the learning rules; partition of pattern space; back-propagation; Kohonen Self-Organizing Networks; Hopfield Networks; supervised and unsupervised learning; associative memories. 																																	
Teaching/Learning Methodology	39 hours of Class activities including - lecture, tutorial, lab, workshop seminar where applicable																																	
Assessment Methods in Alignment with Intended Learning Outcomes	<table border="1" data-bbox="580 1173 1361 1451"> <thead> <tr> <th rowspan="2">Specific Assessment Methods/Tasks</th> <th rowspan="2">% weighting</th> <th colspan="5">Intended subject learning outcomes to be assessed</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> </tr> </thead> <tbody> <tr> <td>Assignments, Tests & Projects</td> <td>55</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> </tr> <tr> <td>Total</td> <td>100</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Specific Assessment Methods/Tasks	% weighting	Intended subject learning outcomes to be assessed					a	b	c	d	e	Assignments, Tests & Projects	55	✓	✓	✓	✓	✓	Final Examination	45	✓	✓	✓	✓		Total	100					
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Student study effort expected	<p>Class Contact:</p> <table border="1" data-bbox="580 1509 1361 1550"> <tr> <td>Class activities (lecture, tutorial, lab)</td> <td>39 hours</td> </tr> </table> <p>Other student study effort:</p> <table border="1" data-bbox="580 1576 1361 1617"> <tr> <td>Assignments, Quizzes, Projects, Exams</td> <td>65 hours</td> </tr> <tr> <td>Total student study effort</td> <td>104 hours</td> </tr> </table>	Class activities (lecture, tutorial, lab)	39 hours	Assignments, Quizzes, Projects, Exams	65 hours	Total student study effort	104 hours																											
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Reading list and references	<ol style="list-style-type: none"> (1) Chan, K.C.C., 2004, Intelligent Information Systems: Course Notes, Department of Computing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong. (2) Pal, S.K., and Shiu, S.C.K., Foundations of Soft Case-Based Reasoning, John Wiley & Sons, Hoboken, New Jersey, 2004. (3) Liebowitz, J., 2010, Knowledge Management: Learning from Knowledge Engineering, CRC Press, Boca Raton, FL. (4) Bojadziev, G., and Bojadziev, M., 2007, Fuzzy Logic for Business, Finance and Management, World Scientific, 																																	

	<p>Singapore.</p> <p>(5) Miller, T.W., 2005, Data and Text mining: A Business Application Approach, Prentice Hall.</p>
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