Subject title: Intelligent Information Systems

Subject code: COMP579

Credits Value (Applicable to Postgraduate Schemes under the Credit-based System): 3

Pre-requisite: Nil

Exclusions: Nil

Learning approach:

<table>
<thead>
<tr>
<th>Learning activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>28 hours</td>
</tr>
<tr>
<td>Tutorial/Laboratory</td>
<td>14 hours</td>
</tr>
</tbody>
</table>

Assessment:

<table>
<thead>
<tr>
<th>Assessment Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Assessment</td>
<td>45%</td>
</tr>
<tr>
<td>Examination</td>
<td>55%</td>
</tr>
</tbody>
</table>

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. By the end of the term, students will:

1. Understand how the latest trend in artificial intelligence can be used to facilitate decision making processes.
2. Learn knowledge management and its relationship to internet computing.
3. Learn the basic principles of pattern recognition and artificial neural network models.
4. Learn the concepts of fuzzy set theory, fuzzy logic, and the engineering of fuzzy systems.
5. Learn how genetic algorithms can be used to solve various optimization problems.
6. Learn the architecture of expert systems and the knowledge acquisition process.

Keyword syllabus:

Introduction
Motivation for the study of artificial and computational intelligence; architecture of an intelligent information systems; decision making and systems; knowledge based expert systems; decision support systems; use of artificial intelligence techniques, data, information and knowledge.
Data, Information and Knowledge
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.

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.

Indicative reading list and references:
Chan, K.C.C., Intelligent Information Systems: Course Notes, Department of Computing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong, 2000.