**Subject Description Form**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>COMP 5123</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Intelligent Information Systems</td>
</tr>
<tr>
<td>Credit Value</td>
<td>3</td>
</tr>
<tr>
<td>Level</td>
<td>5</td>
</tr>
<tr>
<td>Pre-requisite/Exclusion</td>
<td>Nil</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.

**Intended Learning Outcomes**

Upon completion of the subject, students will be able to:

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**

- **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
extraction and retrieval.

- **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>
<thead>
<tr>
<th>Specific Assessment Methods/Tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments, Tests &amp; Projects</td>
<td>55</td>
<td>✔ ✔ ✔ ✔ ✔</td>
</tr>
<tr>
<td>Final Examination</td>
<td>45</td>
<td>✔ ✔ ✔ ✔ ✔</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Student study effort expected

Class activities (lecture, tutorial, lab) 39 hours

Other student study effort:

Assignments, Quizzes, Projects, Exams 65 hours

**Total student study effort** 104 hours

### Reading list and references

Singapore.