Subject Description Form

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>COMP5151</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject Title</td>
<td>Advanced Database 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>Prerequisite: COMP5111 Database Systems and Management [waived for Software Technology students]</td>
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</tbody>
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Objectives

The objectives of this subject are to:

1. Equip students with principles and knowledge of distributed database systems;
2. Discuss in details the key concepts and practical issues in the implementation and application of distributed database systems;
3. Equip students with principles and knowledge of object oriented database system design.

Intended Learning Outcomes

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

a) better understand the principles and knowledge in distributed database systems;
b) explore and identify the various issues related to the development of distributed database system; and
c) recognize the design aspects of OO database system and related development.

Subject Synopsis/Indicative Syllabus

- **Review of database technology**: Overview of object-oriented databases and distributed databases. Comparison between relational, object-oriented distributed database systems.
- **Distributed database systems**: Distributed database vs. distributed data processing, problem areas of distributed database system, architecture of distributed database system, multimedia database.
- **Database design and query processing**: Data fragmentation, allocation, query optimization, execution strategies, object clustering and performance benchmarking.
- **Transaction processing and concurrency control**: Serializability, locking-based concurrency control, design transactions, timestamp-based concurrency control, optimistic concurrency control, deadlock detection and prevention.
- **Database integrity and security**: Data protection and authorization control, multi-level database systems.
- **Overview of object-oriented data modelling**: Object definition, types and classes, object methods, assertions and constraints, and ODMG.
- **Concepts and implementation issues in object-oriented database systems**: Storage structure for complex/composite objects, object identity, encapsulation, types/classes, inheritance, late binding, persistence, indexing mechanism.
- **Optional topics**: Examples may include: application of
distributed database technology to the World Wide Web, web databases, ODBC, JDBC, data warehousing on the web, mobile databases, multimedia databases, spatial and temporal databases.

<table>
<thead>
<tr>
<th>Teaching/Learning Methodology</th>
<th>Class activities including - lecture, tutorial, lab, workshop seminar where applicable</th>
</tr>
</thead>
</table>

### 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>Total</td>
<td>100</td>
<td>✔️ ✔️ ✔️</td>
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### Student study effort expected

**Class Contact:**
- 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