

## Subject Description Form

<b>Subject Code</b>	COMP5151
<b>Subject Title</b>	Advanced Database Systems
<b>Credit Value</b>	3
<b>Level</b>	5
<b>Pre-requisite/ Exclusion</b>	Prerequisite: COMP5111 Database Systems and Management [waived for Software Technology students]
<b>Objectives</b>	<p>The objectives of this subject are to:</p> <ol style="list-style-type: none"> <li>1. Equip students with principles and knowledge of distributed database systems;</li> <li>2. Discuss in details the key concepts and practical issues in the implementation and application of distributed database systems;</li> <li>3. Equip students with principles and knowledge of object oriented database system design.</li> </ol>
<b>Intended Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> <li>a) better understand the principles and knowledge in distributed database systems;</li> <li>b) explore and identify the various issues related to the development of distributed database system; and</li> <li>c) recognize the design aspects of OO database system and related development.</li> </ol>
<b>Subject Synopsis/ Indicative Syllabus</b>	<ul style="list-style-type: none"> <li>• <b>Review of database technology:</b> Overview of object-oriented databases and distributed databases. Comparison between relational, object-oriented distributed database systems.</li> <li>• <b>Distributed database systems:</b> Distributed database vs. distributed data processing, problem areas of distributed database system, architecture of distributed database system, multimedia database.</li> <li>• <b>Database design and query processing:</b> Data fragmentation, allocation, query optimization, execution strategies, object clustering and performance benchmarking.</li> <li>• <b>Transaction processing and concurrency control:</b> Serializability, locking-based concurrency control, design transactions, timestamp-based concurrency control, optimistic concurrency control, deadlock detection and prevention.</li> <li>• <b>Database integrity and security:</b> Data protection and authorization control, multi-level database systems.</li> <li>• <b>Overview of object-oriented data modelling:</b> Object definition, types and classes, object methods, assertions and constraints, and ODMG.</li> <li>• <b>Concepts and implementation issues in object-oriented database systems:</b> Storage structure for complex/composite objects, object identity, encapsulation, types/classes, inheritance, late binding, persistence, indexing mechanism.</li> <li>• <b>Optional topics:</b> Examples may include: application of</li> </ul>

	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.				
<b>Teaching/Learning Methodology</b>	Class activities including - lecture, tutorial, lab, workshop seminar where applicable				
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	Specific Assessment Methods/Tasks	% weighting	Intended subject learning outcomes to be assessed		
			a	b	c
	Assignments, Tests & Projects	55	✓	✓	✓
	Final Examination	45	✓	✓	✓
	Total	100			
<b>Student study effort expected</b>	<b>Class Contact:</b>				
	Class activities (lecture, tutorial, lab)			39 hours	
	<b>Other student study effort:</b>				
	Assignments, Quizzes, Projects, Exams			65 hours	
	<b>Total student study effort</b>			<b>104 hours</b>	
<b>Reading list and references</b>	<p>(1) Blaha, M., 2013, UML Database Modeling Workbook, Technics Publications.</p> <p>(2) Hoffer, J.A., Venkataraman, R., Topi, H., 2012, Modern Database Management, 11<sup>th</sup> Ed, Pretice Hall.</p> <p>(3) Ozsu, M.T. and Valuriez, P., 2011, Principles of Distributed Database System, 3<sup>rd</sup> Ed, Springer.</p> <p>(4) Redmond, E., Wilson, J.R., 2012, Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement, 1<sup>st</sup> Ed, Pragmatic Bookshelf.</p>				