

Subject Description Form

Subject Code	COMP2411			
Subject Title	Database Systems			
Credit Value	3			
Level	2			
Pre-requisite / Co-requisite / Exclusion	Pre-requisite: COMP1011			
Objectives	<p>The objectives of this subject are to:</p> <ul style="list-style-type: none"> • design, develop, implement, and administrate a database system of considerable complexity; and • possess enough background to evaluate various DBMSs of different data models and make the appropriate selection for an organization. 			
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <p><i>Professional/academic knowledge and skills</i></p> <p>(a) acquire a good understanding of the architecture and functioning of database management systems, as well as to be able to use the associated tools and techniques;</p> <p>(b) understand and apply the principles and practices of good database design and analysis; and</p> <p>(c) recognize the direction of database technology and their implication so as to manage and plan database system developments.</p> <p><i>Attributes for all-roundedness</i></p> <p>(d) appreciate development of database technologies for lifelong learning, e.g., web databases; and</p> <p>(e) build up on team spirit, presentation and technical writing skills.</p>			
Subject Synopsis/ Indicative Syllabus	<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">Topic</td> </tr> <tr> <td> <p>1. Basic Concepts of Database System</p> <p>Database and its applications; DBMS design objectives and its components; ANSI/SPARC three-level system architecture; data independence.</p> </td> </tr> <tr> <td> <p>2. Database Design</p> <p>Entity-relationship model; functional dependencies; normalization.</p> </td> </tr> </table>	Topic	<p>1. Basic Concepts of Database System</p> <p>Database and its applications; DBMS design objectives and its components; ANSI/SPARC three-level system architecture; data independence.</p>	<p>2. Database Design</p> <p>Entity-relationship model; functional dependencies; normalization.</p>
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	<p>3. Relational Data Model</p> <p>Relational structure; relational languages: relational algebra, relational calculus, SQL; relational constraints: entity constraints, referential integrity constraints and foreign keys.</p> <p>4. File Structures and Physical Database Design</p> <p>File organization; indexing and hashing.</p> <p>5. Application Design and Query Processing</p> <p>Relational view definition and management; equivalence of query expressions, estimation of query-processing cost, join strategies; embedded SQL.</p> <p>6. Implementation Issues</p> <p>Buffer management; transaction processing; concurrency control; crash and recovery; security and integrity.</p>																																											
<p>Teaching/ Learning Methodology</p>	<p>This subject emphasizes the technical/practical aspects of database design and development. It is intended to equip the student with knowledge and practical experience on the real-life/industrial database application development.</p> <p>The lectures will be used to deliver course material that will be practiced/reinforced during the labs and tutorials.</p>																																											
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1"> <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 (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> <th>e</th> </tr> </thead> <tbody> <tr> <td>Continuous Assessment</td> <td rowspan="2">55%</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1. Assignments, Tests and Projects</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Examination</td> <td>45%</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>100 %</td> <td colspan="5"></td> </tr> </tbody> </table>					Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					a	b	c	d	e	Continuous Assessment	55%						1. Assignments, Tests and Projects	✓	✓	✓	✓	✓	Examination	45%	✓	✓	✓			Total	100 %					
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**Reading List
and References**

Reference Books:

1. Kroenke, David M. and Auer, David J., *Database Processing: Fundamentals, Design and Implementation*, 14th Edition, Prentice Hall, 2016.
2. Mannino, Michael, *Database Design, Application Development, and Administration*, 3rd (international) Edition, McGraw-Hill, 2007.
3. Silberschatz, Abraham, Korth, Henry F. and Sudarshan, S., *Database System Concepts*, 6th Edition, McGraw Hill, 2011.
4. Garcia-Molina, Hector, Ullman, Jeffrey D. and Widom, Jennifer, *Database System Implementation*, 3rd Edition, Prentice Hall, 2008.
5. Date, C. J., *An Introduction to Database Systems*, Addison-Wesley Longman, 2004.