

### Subject Description Form

<b>Subject Code</b>	COMP3335
<b>Subject Title</b>	Database Security
<b>Credit Value</b>	3
<b>Pre-requisite / Co-requisite/ Exclusion</b>	Pre-requisite: COMP2411 Database Systems or equivalent introductory database subject
<b>Objectives</b>	<p>The objectives of this subject are to:</p> <ol style="list-style-type: none"> <li>1. introduce to students about security threats with respect to database applications</li> <li>2. equip students with knowledge of security measures and understanding on the concepts in protecting data</li> <li>3. equip students with skills to design and implement secure database applications with respect to the security requirements</li> </ol>
<b>Intended Subject Learning Outcomes</b>	<p>Upon completion of the subject, students will be able to:</p> <p><u>Professional/Academic Knowledge and Skills</u></p> <ol style="list-style-type: none"> <li>(1) identify security threats in database systems;</li> <li>(2) understand the concepts and security mechanisms in the protection of data;</li> <li>(3) design and implement secure database systems;</li> </ol> <p><u>Attributes for All-Roundness</u></p> <ol style="list-style-type: none"> <li>(4) develop skills in problem solving;</li> <li>(5) solve complex problems in team and function effectively in a team environment to achieve a common goal.</li> </ol>
<b>Contribution of the Subject to the Attainment of the Programme Outcomes</b>	<p>Programme Outcome 3: this subject contributes to developing students' understanding in security requirements in modern database systems.</p> <p>Programme Outcome 4: this subject empowers the students to design and implement database applications to meet the security requirements</p> <p>Programme Outcome 6: this subject contributes to cultivating teamwork spirit through group project.</p>
<b>Subject Synopsis/ Indicative Syllabus</b>	<ol style="list-style-type: none"> <li>1. Overview of Database Concepts Common database technologies and database application architectures, including ER modelling and existing relational database management systems such as MySQL and Oracle; advanced database technologies, including object-oriented databases and distributed databases</li> <li>2. Introduction to Database Security Threats to databases; commonly accepted security goals (integrity, availability and confidentiality); kinds of security control measures</li> <li>3. Access Control Database authorization, including discretionary security mechanisms and mandatory security mechanisms</li> <li>4. Inference Control Nature of statistical database and the inference control mechanism to prevent detailed confidential information</li> <li>5. Flow Control and Data Encryption Flow control as a measure to prevent information from reaching unauthorized users; Data encryption as a measure to protect sensitive data</li> <li>6. Overview of advanced topics Including security threats with respect to SQL injection attacks, virtual private databases and database auditing</li> </ol>

<b>Teaching/Learning Methodology</b>	<p>During the lectures, students will come across the common concepts and theories in database security issues. Those concepts and theories would be explained with reference to real database systems such as Oracle and MySQL.</p> <p>Hands-on exercises in tutorial/laboratory will be included to allow students to explore and analyse practical problems and topics. Group project to solve database security problems will help students to integrate and apply what they have learnt.</p>																																								
<b>Assessment Methods in Alignment with Intended Subject Learning Outcomes</b>	<table border="1" data-bbox="501 367 1382 752"> <thead> <tr> <th data-bbox="501 367 788 591" rowspan="2">Specific Assessment Methods/Tasks</th> <th data-bbox="788 367 970 591" rowspan="2">% Weighting</th> <th colspan="6" data-bbox="970 367 1382 524">Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)</th> </tr> <tr> <th data-bbox="970 524 1027 591">1</th> <th data-bbox="1027 524 1085 591">2</th> <th data-bbox="1085 524 1142 591">3</th> <th data-bbox="1142 524 1200 591">4</th> <th data-bbox="1200 524 1257 591">5</th> <th data-bbox="1257 524 1315 591"></th> <th data-bbox="1315 524 1382 591"></th> </tr> </thead> <tbody> <tr> <td data-bbox="501 591 788 685">Continuous Assessment</td> <td data-bbox="788 591 970 685">55</td> <td data-bbox="970 591 1027 685">✓</td> <td data-bbox="1027 591 1085 685">✓</td> <td data-bbox="1085 591 1142 685">✓</td> <td data-bbox="1142 591 1200 685">✓</td> <td data-bbox="1200 591 1257 685">✓</td> <td data-bbox="1257 591 1315 685"></td> <td data-bbox="1315 591 1382 685"></td> </tr> <tr> <td data-bbox="501 685 788 752">Final Examination</td> <td data-bbox="788 685 970 752">45</td> <td data-bbox="970 685 1027 752">✓</td> <td data-bbox="1027 685 1085 752">✓</td> <td data-bbox="1085 685 1142 752">✓</td> <td data-bbox="1142 685 1200 752">✓</td> <td data-bbox="1200 685 1257 752"></td> <td data-bbox="1257 685 1315 752"></td> <td data-bbox="1315 685 1382 752"></td> </tr> </tbody> </table> <p>Types of assessments include assignments, project, test and examination. Assignments are designed to reinforce the concepts and mechanisms learned in the lecture and laboratory, by solving bigger problems. Project is used to develop students' analytic and problem solving skills by developing a practical database security policy. Test and examination are used to assess independent problem solving and critical thinking skills.</p>								Specific Assessment Methods/Tasks	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)						1	2	3	4	5			Continuous Assessment	55	✓	✓	✓	✓	✓			Final Examination	45	✓	✓	✓	✓			
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Final Examination	45	✓	✓	✓	✓																																				
<b>Student Study Effort Expected</b>	<b>Class contact (time-tabled):</b>																																								
	Lecture							39 hours																																	
	<b>Other student study effort:</b>																																								
	Assignments, project, self-study, text and exam preparation							66 hours																																	
	<b>Total student study effort:</b>							105 hours																																	
<b>Reading List and References</b>	<p>Reference Books:</p> <ol style="list-style-type: none"> <li>Database Security and Auditing: Protecting Data Integrity and Accessibility (2006). Hassan A. Afyouni, Course Technology, ISBN 0619215593.</li> <li>Database Security (2011). Alfred Basta, Melissa Zgola, Cengage Learning, ISBN 1435453905</li> </ol>																																								