

## Subject Description Form

|  |  |
|--|--|
| <b>Subject Code</b>                              | COMP5323   |
| <b>Subject Title</b>                             | Web Database Technologies and Applications   |
| <b>Credit Value</b>                              | 3  |
| <b>Level</b>                                     | 5  |
| <b>Pre-requisite/ Exclusion</b>                  | Prerequisite: COMP5111 Database Systems and Management<br>[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. Enable students with principles and knowledge of web databases and semistructured data in the Internet environment;</li> <li>2. Teach students with sound techniques in designing and querying web database;</li> <li>3. Provide detailed examples of how advance techniques are being applied in web database applications now and the near future.</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) Become familiar of the core components of Web databases;</li> <li>b) design and develop semi-structure data models for Web databases and perform queries on them;</li> <li>c) identify and describe the different design approaches or algorithms adopted in Web databases; and</li> <li>d) compare, select and develop software programs or techniques for web database applications..</li> </ol>  |
| <b>Subject Synopsis/<br/>Indicative Syllabus</b> | <ul style="list-style-type: none"> <li>• <b>Introduction to Web Database Systems:</b> Review of relational, object-oriented, and XML databases.</li> <li>• <b>Semistructured Data:</b> XML basics, the simple API for XML, parsing XML, W3C document object model, SAX parsing, , XML graph model.</li> <li>• <b>XML Data Modeling:</b> DTD and XML Schema. Native XML databases, transforming XML data to relations, and storing XML data in relational databases.</li> <li>• <b>Querying of Web Databases:</b> XPath, XQuery, XQL, XML-QL, unQL, grouping with nested queries, binding elements and contents, querying attributes, joining elements by value, tag variables, mediators for data integration, distributed evaluations, query processing and evaluations.</li> <li>• <b>Typing and Indexing:</b> Schema formalisms, Datalog, extracting schemas from data, data guides, inferring schemas from queries, attribute multiplicity, path constraints in semistructured data, XML schema, XML views, modelling data types, indexing and extending databases in XML.</li> <li>• <b>Web Transactions Management:</b> Serializing relational query results in XML, prefetching and caching, XML transaction servers.</li> <li>• <b>Web Database Systems:</b> Using XML with relational databases, XML support in MS/SQL and Oracle, compressing</li> </ul> |

|  | <p>XML objects, XMill, Web intermediary, and XML wrappers. .</p> <ul style="list-style-type: none"> <li>• <b>Web Services and Applications:</b> Dynamic media contents composition, B2B and B2C e-commerce applications, web services, UDDI, EDI applications, ebXML, VBL, PML and education applications.</li> </ul>   |   |             |   |          |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
|--|---|---|-------------|---|----------|-----------------------------------|------------------|---|---|---|---|-------------------------------|----|---|---|---|---|-------------------|----|---|---|---|---|-------|-----|--|--|--|--|
| <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> | <table border="1"> <thead> <tr> <th rowspan="2">Specific Assessment Methods/Tasks</th> <th rowspan="2">% weighting</th> <th colspan="4">Intended subject learning outcomes to be assessed</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th>d</th> </tr> </thead> <tbody> <tr> <td>Assignments, Tests &amp; Projects</td> <td>55</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Final Examination</td> <td>45</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> | Specific Assessment Methods/Tasks         | % weighting | Intended subject learning outcomes to be assessed |          |                                   |                  | a | b | c | d | Assignments, Tests & Projects | 55 | ✓ | ✓ | ✓ | ✓ | Final Examination | 45 | ✓ | ✓ | ✓ | ✓ | Total | 100 |  |  |  |  |
| Specific Assessment Methods/Tasks                                      | % weighting   |   |             | Intended subject learning outcomes to be assessed |          |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
|  |   | a   | b           | c   | d        |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
| Assignments, Tests & Projects  | 55  | ✓   | ✓           | ✓   | ✓        |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
| Final Examination  | 45  | ✓   | ✓           | ✓   | ✓        |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
| Total  | 100   |   |             |   |          |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
| <b>Student study effort expected</b>                                   | <p><b>Class Contact:</b></p> <table border="1"> <tr> <td>Class activities (lecture, tutorial, lab)</td> <td>39 hours</td> </tr> </table> <p><b>Other student study effort:</b></p> <table border="1"> <tr> <td>Assignments, Quizzes, Projects, Exams</td> <td>65 hours</td> </tr> <tr> <td><b>Total student study effort</b></td> <td><b>104 hours</b></td> </tr> </table>  | Class activities (lecture, tutorial, lab) | 39 hours    | Assignments, Quizzes, Projects, Exams             | 65 hours | <b>Total student study effort</b> | <b>104 hours</b> |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
| Class activities (lecture, tutorial, lab)                              | 39 hours  |   |             |   |          |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
| Assignments, Quizzes, Projects, Exams                                  | 65 hours  |   |             |   |          |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
| <b>Total student study effort</b>                                      | <b>104 hours</b>  |   |             |   |          |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |
| <b>Reading list and references</b>                                     | <p>(1) Bhowmick, Madria, Ng, 2013, Web Data Management: A Warehouse Approach, 2<sup>nd</sup> Ed, Springer.</p> <p>(2) Abiteboul, S., Manolescu, I., Rigaux, P., Rousset, M.C., Senellart, P., 2011, Web Data Management, 1<sup>st</sup> Ed, Cambridge University Press.</p>   |   |             |   |          |                                   |                  |   |   |   |   |                               |    |   |   |   |   |                   |    |   |   |   |   |       |     |  |  |  |  |