### Course Competency Report by Code

**Code:** C192

**Data Management for Programmers (C192)**

<table>
<thead>
<tr>
<th>Course of Study:</th>
<th>C192 - Data Management for Programmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Level:</td>
<td>Undergraduate</td>
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<tr>
<td>Course Division:</td>
<td>Upper Division Major</td>
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<tr>
<td>Discipline:</td>
<td>Information Technology</td>
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<td>Course Type:</td>
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<tr>
<th>COMPETENCY #</th>
<th>COMPETENCY NAME</th>
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<tr>
<td>4023.1.1</td>
<td>Store Data</td>
<td>The graduate designs a conceptual and logical model for storing various formats and types of data in a database management system (DBMS).</td>
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<tr>
<td>4023.1.2</td>
<td>Use SQL</td>
<td>The graduate applies SQL Data Definition Language (DDL) to create, modify, and drop databases, tables, views, and indexes; employs SQL Data Manipulation Language (DML) to select, insert, update, and delete data in tables in a database management system (DBMS) environment; and programs in SQL Programming Language (PL/SQL) to run persistent applications such as stored procedures, functions, and triggers.</td>
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<tr>
<td>4023.1.3</td>
<td>Distribute Data</td>
<td>The graduate logically and physically distributes data through the design of data warehouses, data marts, and distributed databases.</td>
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<tr>
<td>4023.1.4</td>
<td>Present Data</td>
<td>The graduate applies tools and technologies such as XML, warehouses, and data mining to extract and present data.</td>
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<tr>
<td>4023.1.5</td>
<td>Secure Data</td>
<td>The graduate secures data by designing and implementing access controls and encryption.</td>
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<tr>
<td>4023.1.6</td>
<td>Manage Data Transactions</td>
<td>The graduate manages data transactions through ACID (atomicity, consistency, isolation, durability) properties and concurrency control: serialization, locking methods, deadlock prevention, timestamping, and optimistic techniques.</td>
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<tr>
<td>4023.1.7</td>
<td>Administer Data</td>
<td>The graduate administers data by performing backups, disaster recovery planning, and SQL performance tuning and query optimization.</td>
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