## Subject Description Form

<table>
<thead>
<tr>
<th><strong>Subject Code</strong></th>
<th>COMP6703</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subject Title</strong></td>
<td>Advanced Topics in Data Analytics</td>
</tr>
<tr>
<td><strong>Credit Value</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Level</strong></td>
<td>6</td>
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</tbody>
</table>

### Pre-requisite / Co-requisite / Exclusion
- Undergraduate introductory background in
  - Probability and statistics
  - Database and data modeling

### Objectives
The goal of this course is to introduce students to a variety of data analysis methods that are useful for understanding, visualizing and getting insight of data from different researches and applications.

In addition to concentrate on formulas and how they are computed, we'll use existing software or write programs to explore a variety of statistical problems concerning text and/or numbers, both numerically and graphically.

### Intended Learning Outcomes
Upon completion of the subject, students will be able to:

(a) understand various statistical methods for data analysis and relate or apply them to the data encountered in research;

(b) understand various quantitative methods for data analysis and relate or apply them to the data encountered in research;

(c) carry out in-depth analysis of the data encountered in research.

### Subject Synopsis/Indicative Syllabus

1. Data Types and Characteristics
   a. Relational data, graph data, time series data, text data, survey data, multimedia data, etc.

2. Statistical Methods for Data Analysis
   a. Multiple, logistic and non-linear regressions
   b. Discriminant analysis

3. Quantitative Methods for Data Analysis
   a. Time series analysis
   b. Probabilistic modeling
   c. Optimization

4. Decision Analysis
   a. Multiple objectives
   b. Decision trees
   c. Influence
   d. Sensitivity analysis

5. Exploratory Analysis
   a. Data Visualization

6. Big Data Analytics
   a. Unstructured data concepts (key-value)
   b. MapReduce technology
   c. Analytics for big data

7. Application Examples

### Teaching/Learning Methodology
Lectures teach students on the main concepts and methods of the course, together with comprehensive examples, and class questions/answers/discussions for easy understanding.
Tutorials and lab sessions offer the opportunity for students to review and consolidate the lecture and reference materials through exercises and also software tools.

Project assignments will give students the opportunity to solve practical data analysis problems.

Written assignments help students to develop a solid foundation of data analytics.

### Assessment Methods in Alignment with Intended Learning Outcomes

<table>
<thead>
<tr>
<th>Specific assessment methods/tasks</th>
<th>% weighting</th>
<th>Intended subject learning outcomes to be assessed (Please tick as appropriate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assignments</td>
<td>70%</td>
<td>□ □ □</td>
</tr>
<tr>
<td>2. Project</td>
<td></td>
<td>□</td>
</tr>
<tr>
<td>3. Tests/Quizzes</td>
<td></td>
<td>□ □ □</td>
</tr>
<tr>
<td>4. Examination</td>
<td>30%</td>
<td>□ □ □</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

**Assignment(s):** assessment of the theoretic studies with respect to the understanding of the relevant subject matters including new concepts, algorithms and techniques by proving answers to the assignment questions

**Project:** assessment of the ability for problem solving through real case studies and implementation of a prototype system for demonstration

**Test:** assessment of the overall performance by written report, oral presentation and exam or quiz.

### Student Study Effort Expected

<table>
<thead>
<tr>
<th>Component</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class contact:</td>
<td>39 Hrs.</td>
</tr>
<tr>
<td>Lecture/Tutorial/Lab</td>
<td></td>
</tr>
<tr>
<td>Other student study effort:</td>
<td></td>
</tr>
<tr>
<td>Reading</td>
<td>40 Hrs.</td>
</tr>
<tr>
<td>Preparing written and project and assignments, quizzes/tests, examination</td>
<td>43 Hrs.</td>
</tr>
<tr>
<td>Total student study effort</td>
<td>122 Hrs.</td>
</tr>
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</table>

### Reading List and References


+ web references