

Subject Description Form

Subject Code	COMP6703
Subject Title	Advanced Topics in Data Analytics
Credit Value	3
Level	6
Pre-requisite / Co-requisite/ Exclusion	Undergraduate introductory background in <ul style="list-style-type: none"> - Probability and statistics - Database and data modeling
Objectives	<p>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.</p> <p>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.</p>
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ul style="list-style-type: none"> (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	<ol style="list-style-type: none"> 1. Data Types and Characteristics <ol style="list-style-type: none"> a. Relational data, graph data, time series data, text data, survey data, multimedia data, etc. 2. Statistical Methods for Data Analysis <ol style="list-style-type: none"> a. Multiple, logistic and non-linear regressions b. Discriminant analysis 3. Quantitative Methods for Data Analysis <ol style="list-style-type: none"> a. Time series analysis b. Probabilistic modeling c. Optimization 4. Decision Analysis <ol style="list-style-type: none"> a. Multiple objectives b. Decision trees c. Influence d. Sensitivity analysis 5. Exploratory Analysis <ol style="list-style-type: none"> a. Data Visualization 6. Big Data Analytics <ol style="list-style-type: none"> 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.

	<p>Tutorials and lab sessions offer the opportunity for students to review and consolidate the lecture and reference materials through exercises and also software tools.</p> <p>Project assignments will give students the opportunity to solve practical data analysis problems.</p> <p>Written assignments help students to develop a solid foundation of data analytics.</p>																																																					
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1" data-bbox="520 568 1461 887"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a</th> <th>b</th> <th>c</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1. Assignments</td> <td rowspan="3">70%</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2. Project</td> <td></td> <td></td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. Tests/Quizzes</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4. Examination</td> <td>30%</td> <td>√</td> <td>√</td> <td>√</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>100%</td> <td colspan="6"></td> </tr> </tbody> </table> <p>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.</p>		Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)						a	b	c				1. Assignments	70%	√	√	√				2. Project			√				3. Tests/Quizzes	√	√	√				4. Examination	30%	√	√	√				Total	100%						
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<p>Reading List and References</p>	<ol style="list-style-type: none"> 1. Wikibook: Statistics - Probability and Data Analysis (http://en.wikibooks.org/wiki/Statistics) 2. John A. Rice, Mathematical Statistics and Data Analysis (with CD Data Sets) (Duxbury Advanced), 3rd Ed., 2006. 3. Philipp K. Janert, Data Analysis with Open Source Tools (A hands-on guide for programmers and data scientists), O'Reilly Media, 2010. 4. Jimmy Lin and Chris Dyer, Data-Intensive Text Processing with MapReduce, Morgan & Claypool Publishers, 2010. <p>+ web references</p>																																																					