

### **3.2.13 Bachelor of Science in Business Analytics - Co-operative Education Programme**

#### **Objective**

The emerging phenomena of Big Data - large pools of data sets that can be captured, communicated, aggregated, stored, and analyzed - has presented companies and organisations with trillions of bytes of information about their customers, suppliers, and operations. Millions of networked sensors are also embedded in various devices such as mobile phones and tablet computers to sense, create, and communicate data. Big data is now part of every industry sector and function of the global economy. It is increasingly the case that modern economic activity, innovation, and growth have to take place with data and the related analytic processes, methods and outputs. The discipline of business analytics (BA) enables companies and organisations to realise the full potential of data generated from various business processes, sources and devices, thus improving their speed and effectiveness in generating business insights and intelligence for optimal decision making purposes.

#### **Programme Introduction**

The Bachelor of Science (Business Analytics) degree programme is an inter-disciplinary undergraduate degree programme offered by the School of Computing with participation from the Business School, Faculty of Engineering, Faculty of Science, and Faculty of Arts and Social Sciences. This is a four-year direct honours programme which offers a common two-year broad-based inter-disciplinary curriculum where all students will read modules in Mathematics, Statistics, Economics, Accounting, Marketing, Decision Science, Industrial and Systems Engineering, Computer Science and Information Systems. Students in their third and fourth years of study may choose elective modules from two lists of either functional or methodological elective modules. Functional elective modules span business functions or sectors of marketing, retailing, logistics, healthcare, etc. Methodological elective modules include those related to big data techniques, statistics, text mining, data mining, social network analysis, econometrics, forecasting, operations research, etc. In sum, these elective modules span the most exciting and challenging areas of business analytics practice in the industry today.

#### **Programme Learning Objectives**

Learning objectives of the Bachelor of Science (Business Analytics) degree programme are:

- To understand the conceptual and methodological foundations of analytical methods and techniques for business analytics, as referenced from disciplines such as computing, engineering, science, mathematics, statistics, business and economics
- To appreciate and understand current business analytics problems in the industry worldwide and be able to identify and resolve practically relevant business analytics questions and issues
- To apply appropriate analytic tools and techniques to resolve complex business analytics problems in various industry sectors and domains

•To cultivate the practices of independent and group learning on the part of students that will prepare them to function effectively for diverse careers in business analytics

### University Scholars Programme (Business Analytics)

Students in the University Scholars Programme (USP) who choose the Bachelor of Science (Business Analytics) degree programme will do so with the following variations:

1. They will not be required to read IS2101 Business and Technical Communication in the Core modules requirement. It is replaced by USP Foundation module of Writing and Critical Thinking.
2. They will read GER1000 Quantitative Reasoning (4 MCs) as compulsory module for the University Level Requirements (ULR). The remaining 16 MCs in ULR are replaced by the 3 USP Inquiry Modules and 1 USP Foundation module ( i.e. University Scholars Seminar).
3. They will not be required to read Unrestricted Electives (16 MCs). These are replaced by the USP Reflection module of Senior Seminar and 3 USP Inquiry modules.

**Table 8: Summary of degree requirements for Bachelor of Science (Business Analytics) - Co-operative Education Programme**

MODULES	MCS	SUB TOTALS
UNIVERSITY LEVEL REQUIREMENTS Please refer to Section 3.2.1.		20
PROGRAMME REQUIREMENTS		124
Core Modules	84	
BT1101 Introduction to Business Analytics	4	
CS1010S Programming Methodology	4	
CS2030 Programming Methodology I	4	
EC1301 Principles of Economics <sup>1</sup>	4	
IS1103/X IS Innovations in Organisations and Society	4	
Either MA1311 Matrix Algebra; or MA1101R Linear Algebra I <sup>2</sup>	4	
MA1521 Calculus for Computing, or MA1102R Calculus <sup>2</sup>	4	
MKT1705X Principles of Marketing	4	
BT2101 Decision Making Methods and Tools	4	
BT2102 Data Management and Visualisation	4	
CS2040 Data Structures and Algorithms	4	
IS2101 Business and Technical Communication	4	
ST2334 Probability and Statistics <sup>3a</sup>	4	

MODULES	MCS	SUB TOTALS
BT3102 Computational Methods for Business Analytics	4	
BT3103 Application Systems Development for Business Analytics	4	
IS3103 Information Systems Leadership and Communication	4	
BT4240 Machine Learning for Predictive Data Analytics <sup>3a</sup>	4	
<b>Programme Electives (PE)</b>	<b>24</b>	

MODULES	MCS	SUB TOTALS
<p>Choose 6 modules to make up 24 MCs from both List A and List B, with at least 2 modules from each list. 5 of 6 modules must be at 4000 level.</p> <p><u>List A (Business Applications):</u>            DBA3712 Dynamic Pricing and Revenue Management            IE3120 Manufacturing Logistics            IS3240 Digital Platform Strategy and Architecture            BT4013 Analytics for Capital Market Trading and Investment            BT4016 Risk Analytics for Financial Services            BT4211 Data-Driven Marketing            BT4212 Search Engine Optimization and Analytics            DBA4811 Analytical Tools for Consulting            IS4250 Healthcare IT and Analytics            MKT4812 Marketing Analytics</p> <p><u>List B (Analytical Methods):</u>            IE2110 Operations Research I, or DBA3701 Introduction To Optimisation            CS3244 Machine Learning            DBA3803 Predictive Analytics in Business            BSE4711 Econometrics for Business II            BT4012 Fraud Analytics            BT4015 Geospatial Analytics            BT4221 Big Data Techniques and Technologies            BT4222 Mining Web Data for Business Insights            BT4240 Machine Learning for Predictive Data Analytics            IS4241 Social Media Network Analysis            IE4210 Operations Research II            ST3131 Regression Analysis <sup>3a</sup>            ST4245 Statistical Methods for Finance</p> <p><u>List C (Technology Implementation):</u>            IS3221 Enterprise Resource Planning Systems            IS3261 Mobile Solutions Design and Development            BT4014 Analytics Driven Design of Adaptive Systems            IS4228 Information Technologies in Financial Services            IS4302 Blockchain and Distributed Ledger Technologies</p> <p><b>Specialisations:</b>            To be awarded the Financial Analytics Specialisation, students must satisfy the followings:  <b>Compulsory modules</b> (do all 3 modules):</p> <ul style="list-style-type: none"> <li>• BT4013 Analytics for Capital Market Trading and Investment</li> <li>• BT4016 Risk Analytics for Financial Services</li> <li>• IS4228 Information Technologies in Financial Services</li> </ul> <p><b>Elective modules</b> (select any 3 modules):</p> <ul style="list-style-type: none"> <li>• BT4012 Fraud Analytics</li> <li>• BT4221 Big Data Techniques and Technologies</li> <li>• BT4222 Mining Web Data for Business Insights</li> <li>• IS4234 Compliance and Regulation Technology</li> <li>• IS4302 Blockchain and Distributed Ledger Technologies</li> </ul> <p>To be awarded the Marketing Analytics Specialisation, students must satisfy the followings:  <b>Compulsory modules</b> (do all 3 modules):</p> <ul style="list-style-type: none"> <li>• BT4211 Data-Driven Marketing</li> <li>• BT4212 Search Engine Optimization and Analytics</li> <li>• BT4222 Mining Web Data for Business Insights</li> </ul> <p><b>Elective modules</b> (select any 3 modules):</p> <ul style="list-style-type: none"> <li>• BT4014 Analytics Driven Design of Adaptive Systems</li> <li>• BT4015 Geospatial Analytics [new]</li> <li>• BT4221 Big Data Techniques and Technologies</li> <li>• IS3240 Economics of E-Business</li> <li>• IS4241 Social Media Network Analysis</li> </ul>	<p>All modules are 4 MCs.</p>	

MODULES	MCS	SUB TOTALS
<b>Co-op Internship Scheme</b>	<b>32</b>	
BT2010 Business Analytics Immersion Programme	<b>6</b>	
BT4010 Business Analytics Internship Programme <sup>4</sup>	<b>12</b>	
BT4011 Business Analytics Capstone Industry Project	<b>14</b>	
UNRESTRICTED ELECTIVES		16
Grand Total		160

<sup>1</sup> Students have done EC1101E Introduction to Economic Analysis can use it to replace EC1301.

<sup>2</sup> Students are encouraged to take these MA module options should they wish to pursue a more rigorous treatment of the subject topics covered.

<sup>2a</sup> For students taking Second Major in Statistics, they can replace ST2334 with ST2131 to meet first major requirement. For students taking the Second Major in Mathematics, they can replace ST2334 with both ST2131 and ST2132 to meet first major requirement. The MCs for ST2132 come from UE. For students taking the minor in Mathematics, they can replace ST2334 with ST2131 and take ST2132 as an unrestrictive elective to meet first major requirement.

<sup>3</sup> Students are encouraged to take IE2110 should they wish to choose IE4210 as an elective module.

<sup>3a</sup> Students who are doing or contemplating to do minor/second major requiring ST3131 such as Statistics which has more than allowed overlap cannot double count ST3131 towards fulfilling the BSc (BA) programme elective requirement.

<sup>4</sup> BT4010 is equivalent to IS4010 (which is offered in regular programme).