## Major: Data Science and Analytics

### Levels

<table>
<thead>
<tr>
<th>Levels</th>
<th>Major Requirements</th>
<th>Cum MCs</th>
</tr>
</thead>
</table>
| Level 1000 (16 MCs) | Pass  
- CS1010/—S/—X Programming Methodology  
- DSA1101 Introduction to Data Science  
- MA1101R Linear Algebra I  
- MA1102R Calculus | 16 |
| Level 2000 (24 MCs) | Pass  
- CS2040 Data Structures and Algorithms  
- DSA2101 Essential Data Analytics Tools: Data Visualisation  
- DSA2102 Essential Data Analytics Tools: Numerical Computation  
- MA2311 Techniques in Advanced Calculus  
**Or** MA2104 Multivariate Calculus  
- ST2131/MA2216 Probability  
- ST2132 Mathematical Statistics | 40 |
| Levels 3000 and 4000 (56 MCs) | Pass  
- CS3244 Machine Learning  
- DSA3101 Data Science in Practice  
- DSA3102 Essential Data Analytics Tools: Convex Optimisation  
- ST3131 Regression Analysis  
**Either** DSA4199 Honours Project in Data Science  
**Or** DSA4299 Applied Project in Data Science  
- Six additional modules from List A and List B subject to the following restrictions:  
  + There must be at least two modules each from List A and from List B/List B  
  + A maximum of two DSA426X series modules can be used to fulfil this requirement  
  + There must be at least four modules at level 4000 | 96 |

### Summary of Requirements

<table>
<thead>
<tr>
<th></th>
<th>MCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Requirements</td>
<td>20</td>
</tr>
<tr>
<td>Faculty Requirements *</td>
<td>8</td>
</tr>
<tr>
<td><strong>Major Requirements</strong></td>
<td>96</td>
</tr>
<tr>
<td>Unrestricted Elective Modules</td>
<td>36</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>160</strong></td>
</tr>
</tbody>
</table>

### List A — DSA modules

- DSA4211 High-Dimensional Statistical Analysis  
- DSA4212 Optimisation for Large-Scale Data-Driven Inference  
- DSA4261 Sense-Making Case Analysis: Logistics and Transport  
- DSA4262 Sense-Making Case Analysis: Health and Medicine  

### List B1 — DSA-recognised modules

- (no hidden pre-requisites)  
- MA3236 Nonlinear Programming  
- MA3252 Linear and Network Optimisation  
- MA4270 Data Modelling and Computation  
- ST3232 Design and Analysis of Experiments  
- ST3233 Applied Time Series Analysis  
- ST3239 Survey Methodology  
- ST3240 Multivariate Statistical Analysis  
- ST3247 Simulation  
- ST4231 Computer Intensive Statistical Methods  
- ST4234 Bayesian Statistics  
- ST4248 Statistical Learning II  

### List B2 — DSA-recognised modules (with hidden pre-requisites) †

- CS3210 Parallel Computing  
- CS3223 Database Systems Implementation  
- CS3230 Design and Analysis of Algorithms  
- CS3243 Introduction to Artificial Intelligence  
- CS4224 Distributed Databases  
- CS4225 Big Data Systems for Data Science  
- CS4231 Parallel and Distributed Algorithms  
- CS4234 Optimisation Algorithms  
- CS4243 Computer Vision and Pattern Recognition  
- CS4248 Natural Language Processing  
- CS5340 Uncertainty Modelling in AI  
- MA4230 Matrix Computation  

* Faculty requirements of 16 MCs are partially fulfilled through the reading of CS/MA/ST modules within the major. Students are required to fulfill the remaining 8 MCs of Faculty requirements from any two (2) of the following subject groups: Chemical Sciences, Life Sciences, Physical Sciences and Multidisciplinary & Interdisciplinary Sciences; but not from the following groups: Computing Sciences and Mathematical & Statistical Sciences.

† Students who wish to read these modules would have to read additional pre-requisite modules and should consult the Faculty/Department for academic advice on their study plans.

**Changes and additions are shown in red.**

**Version: May 2019**  
Click on the module codes for information