### Second Major: Data Analytics

**Applicable to cohorts: AY 2017/2018 and after**

<table>
<thead>
<tr>
<th>Levels</th>
<th>Second Major Requirements</th>
<th>Cum MCs</th>
</tr>
</thead>
</table>
| Level 1000 (10–12 MCs) | Pass  
– One of the following modules:  
  + CS1010/E/—J/S/X Programming Methodology  
  + IT1007 Introduction to Programming with Python and C  
– One of the following modules:  
  + MA1101R Linear Algebra I  
  + MA1311 Matrix Algebra  
  + MA1508E Linear Algebra for Engineering  
  + MA1513 Linear Algebra with Differential Equations (2 MCs)  
– One of the following (pair of) modules:  
  + MA1102R Calculus  
  + MA1312 Calculus with Applications  
  + MA1505 Mathematics I  
  + MA1507 Advanced Calculus  
  + MA1511 Engineering Calculus (2 MCs)  
  + MA1512 Differential Equations for Engineering (2 MCs)  
  + MA1521 Calculus for Computing | 10–12 |
| Level 2000 (16 MCs) | Pass  
– CS2040 Data Structures and Algorithms  
– ST2131/MA2216 Probability  
– ST2132 Mathematical Statistics  
– One of the following modules:  
  + DSA2101 Essential Data Analytics Tools: Data Visualisation  
  + DSA2102 Essential Data Analytics Tools: Numerical Computation | 26–28 |
| Levels 3000 and 4000 (20–24 MCs) | Pass  
– ST3131 Regression Analysis  
– One of the following modules:  
  + DSA3102 Essential Data Analytics Tools: Convex Optimisation*  
  + DBA3701 Introduction to Optimisation  
  + MA3236 Nonlinear Programming*  
  + MA3252 Linear and Network Optimisation  
– One module from List I  
– One module from List II  
– One other module from List I or List II  
– One additional module from List I or List II | 48–50 |

^ Applicable only to students who use MA1513 Linear Algebra with Differential Equations (2 MCs) to fulfil the second major requirements.

This second major is **not** offered with the following primary majors: Applied Mathematics, Business Analytics, Computational Biology, Computer Engineering, Computer Science, Data Science and Analytics, Industrial and Systems Engineering, Information Security, Mathematics, Quantitative Finance, Statistics, and the following minors: Financial Mathematics, Mathematics, Statistics.
<table>
<thead>
<tr>
<th>List I</th>
<th>List II</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSA4211 High-Dimensional Statistical Analysis</td>
<td>CS3244 Machine Learning</td>
</tr>
<tr>
<td>DSA4212 Optimisation for Large-Scale Data-Driven Inference*</td>
<td>ST3240 Multivariate Statistical Analysis</td>
</tr>
<tr>
<td></td>
<td>ST3247 Simulation</td>
</tr>
<tr>
<td></td>
<td>ST3248 Statistical Learning I</td>
</tr>
<tr>
<td></td>
<td>ST4248 Statistical Learning II</td>
</tr>
</tbody>
</table>

Students who participate in credit-bearing full-time internships/industrial attachments/professional placements as part of their degree requirements may be approved to double-count up to 8 MCs into List I if their internships/industrial attachments/professional placements have substantial data-analytics content, provided the limit of 16 MCs of double-counting in primary and second major requirements is not exceeded.

* Students may need to read additional modules outside the second major requirements to satisfy the pre-requisites of these modules.

Version: August 2017