# B.Sc. & B.Sc. (Hons) with Major in Applied Mathematics

## Graduation Requirements for students admitted in AY2016/17

To be awarded a B.Sc. or B.Sc.(Hons) with primary major in Applied Mathematics, in addition to the University and Faculty requirements, a candidate must satisfy the following:

<table>
<thead>
<tr>
<th>Module Level</th>
<th>Major Requirements</th>
<th>Level MCs</th>
<th>Cumulative Major MCs</th>
</tr>
</thead>
</table>
| 1000         | 1. Pass the 4 modules in List I  
2. Pass CS1010/CS1010E/CS1010S/CS1010X Programming Methodology | 20 (^16)  
20 (^16) | |
| 2000         | 3. Pass all the following modules:  
- MA2101/MA2101S Linear Algebra II  
- MA2108/MA2108S Mathematical Analysis I  
- MA2213 Numerical Analysis I  
- MA2216/ST2131 Probability  
4. Pass one additional module from List II, III, IV | 20-23 (^24-27)  
40-43 | |
| 3000         | 5. Pass all the following modules:  
- MA3110/MA3110S Mathematical Analysis II  
- MA3111/MA3111S Complex Analysis I  
6. Pass two modules from List AM3  
7. Pass one additional module from List III, IV | 20-23  
60-66 | |
| 4000         | 8. Pass MA4199 Honours Project in Mathematics  
9. Pass four modules from List AM4  
10. Pass one additional module from List IV | 32-33  
92-98 | |
| UROPS        | At most one Mathematics UROPS module may be used to fulfil the requirements of Major in Mathematics | | |
To be awarded a **B.Sc.(Hons.) with primary major in Applied Mathematics with Specialisation in Mathematical Modelling and Data Analytics**, in addition to the University and Faculty requirements, a candidate must satisfy the following:

<table>
<thead>
<tr>
<th>Module Level</th>
<th>Major Requirements</th>
<th>Level MCs</th>
<th>Cumulative Major MCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>3. Pass all the following modules:  &lt;br&gt;• MA2101/MA2101S Linear Algebra II  &lt;br&gt;• MA2108/MA2108S Mathematical Analysis I  &lt;br&gt;• MA2213 Numerical Analysis I  &lt;br&gt;• MA2216/ST2131 Probability  &lt;br&gt;4. Pass one additional module from List II, III, IV</td>
<td>20-23 (^24-27)</td>
<td>40-43</td>
</tr>
<tr>
<td>3000</td>
<td>5. Pass all the following modules:  &lt;br&gt;• MA3110/MA3110S Mathematical Analysis II  &lt;br&gt;• MA3111/MA3111S Complex Analysis I  &lt;br&gt;6. Pass two modules from List AM3-MMDA  &lt;br&gt;7. Pass one additional module from List III, IV</td>
<td>20-23</td>
<td>60-66</td>
</tr>
<tr>
<td>UROPS</td>
<td>At most one Mathematics UROPS module may be used to fulfil the requirements of Major in Mathematics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
To be awarded a **B.Sc.(Hons.) with primary major in Applied Mathematics with Specialisation in Operations Research and Financial Mathematics**, in addition to the University and Faculty requirements, a candidate must satisfy the following:

<table>
<thead>
<tr>
<th>Module Level</th>
<th>Major Requirements</th>
<th>Level MCs</th>
<th>Cumulative Major MCs</th>
</tr>
</thead>
</table>
| 1000         | 1. Pass the 4 modules in **List I**  
               2. Pass CS1010/CS1010E/CS1010S/CS1010X Programming Methodology | 20 (\(^{16}\)) | 20 (\(^{16}\)) |
| 2000         | 3. Pass all the following modules:  
               • MA2101/MA2101S Linear Algebra II  
               • MA2108/MA2108S Mathematical Analysis I  
               • MA2213 Numerical Analysis I  
               • MA2216/ST2131 Probability  
               4. Pass one additional module from **List II, III, IV** | 20-23 (\(^{24-27}\)) | 40-43 |
| 3000         | 5. Pass all the following modules:  
               • MA3110/MA3110S Mathematical Analysis II  
               • MA3111/MA3111S Complex Analysis I  
               6. Pass two modules from **List AM3-ORFM**  
               7. Pass one additional module from **List III, IV** | 20-23 | 60-66 |
| 4000         | 8. Pass MA4199 Honours Project in Mathematics  
               9. Pass four modules from **List AM4-ORFM**  
               10. Pass one additional module from **List IV** | 32-33 | 92-98 |
| UROPS        | At most one Mathematics UROPS module may be used to fulfil the requirements of Major in Mathematics | | |

**List I**
- MA1100 Fundamental Concepts of Mathematics or CS1231 Discrete Structures
- MA1101R Linear Algebra I
- MA1102R Calculus
- MA1104/MA2104\(^*\) Multivariable Calculus

**List II**
- All MA modules at level 2000, except those coded MA23XX
- PC2130 Quantum Mechanics I
- PC2132 Classical Mechanics
- ST2132 Mathematical Statistics
- EC2101 Microeconomic Analysis I
### List III
- All MA modules at level 3000, except MA3311 and MA3312
- BSE3703 Econometrics for Business I
- CS3230 Design & Analysis of Algorithms
- CS3234 Logic and Formal Systems
- CS4232 Theory of Computation
- DSA3102 Essential Data Analytics Tools: Convex Optimisation
- EC3101 Microeconomic Analysis II
- EC3303 Econometrics I
- PC3130 Quantum Mechanics II
- PC3236 Computational Methods in Physics
- PC3238 Fluid Dynamics
- ST3131 Regression Analysis
- ST3236 Stochastic Processes I

### List IV
- All MA modules at level 4000 or higher
- CS4232 Theory of Computation
- CS4234 Optimisation Algorithms
- CS4236 Cryptography Theory and Practice
- CS5230 Computational Complexity
- CS5237 Computational Geometry and Applications
- DSA4211 High-Dimensional Statistical Analysis
- DSA4212 Optimisation for Large-Scale Data-Driven Inference
- EC4301 Microeconomic Analysis III
- EC5104 Mathematical Economics
- PC4248 Relativity
- PC4274 Mathematical Methods in Physics III
- ST4238 Stochastic Processes II
- ST4245 Statistical Methods for Finance

### List AM3
List AM3 consists of the following 3 baskets AM3-General, AM3-MMDA, AM3-ORFM.

#### AM3-General
- MA3209 Mathematical Analysis III
- MA3218 Applied Algebra
- MA3220 Ordinary Differential Equations

#### AM3-MMDA
- MA3227 Numerical Analysis II
- MA3233 Combinatorics and Graph II
- MA3264 Mathematical Modelling
- ST3131 Regression Analysis
**AM3-ORFM**

- MA3236 Nonlinear Programming
- MA3252 Linear and Network Optimization
- MA3269 Mathematical Finance I
- ST3131 Regression Analysis

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**List AM4**

**List AM4 consists of the following 3 baskets AM4-General, AM4-MMDA, AM4-ORFM.**

**AM4-General**

- MA4211 Functional Analysis
- MA4221 Partial Differential Equations
- MA4235 Topics in Graph Theory
- MA4261 Coding and Cryptography

**AM4-MMDA**

- MA4229 Approximation Theory
- MA4230 Matrix Computation
- MA4255 Numerical Methods in Differential Equations
- MA4268 Mathematics for Visual Data Processing
- MA4270 Data Modelling and Computation
- MA4272 Mathematical Tools for Data Science
- **DSA4211 High-Dimensional Statistical Analysis**

**AM4-ORFM**

- MA4254 Discrete Optimization
- MA4260 Stochastic Operations Research
- MA4264 Game Theory
- MA4269 Mathematical Finance II
- ST4245 Statistical Methods for Finance

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**Modular Credit Cumulative Table**

<table>
<thead>
<tr>
<th>Requirements</th>
<th>B.Sc.</th>
<th>B.Sc. (Hons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Requirements</td>
<td>20 MC</td>
<td>20 MC</td>
</tr>
<tr>
<td>Faculty Requirements</td>
<td>4-8 MC*</td>
<td>4-12 MC*</td>
</tr>
<tr>
<td>Major Requirements</td>
<td>60-66 MC</td>
<td>92-98 MC</td>
</tr>
<tr>
<td>Unrestricted Free Electives</td>
<td>26-36 MC</td>
<td>30-44 MC</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>120 MC</strong></td>
<td><strong>160 MC</strong></td>
</tr>
</tbody>
</table>

*Faculty requirements of 12MCs and 16MCs (required for the B.Sc. and B.Sc.(Hons) programmes respectively) are partially fulfilled through the reading of CS/PC/ST modules within the major.
^Adjusted Level and Cumulative Major MCs respectively if taking MA2104 to fulfil List I.

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