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

**Graduation Requirements for students admitted in AY2015/16**

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/CS1010FC/CS1101S* Programming Methodology  
               *CS1101S (5MCs) may be read as an alternative to CS1010% (4MCs) to facilitate relevant programmes, e.g. Double Degree Programme with School of Computing. Registration for this module is subject to host availability. | 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 two additional modules from List III, IV | 24-27* | 64-70* |
| 4000         | 8. Pass MA4199 Honours Project in Mathematics  
               9. Pass four modules from List AM4  
               10. Pass two additional modules from List IV | 36-37* | 100-106* |
| 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>
</table>
| 1000         | 1. Pass the 4 modules in List I  
|              | *CS1101S (5MCs) may be read as an alternative to CS1010% (4MCs) to facilitate relevant programmes, e.g. Double Degree Programme with School of Computing. Registration for this module is subject to host availability.                      |           |                      |
| 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-MMDA  
7. Pass two additional modules from List III, IV                                                                                         | 24-27*    | 64-70*               |
| 4000         | 8. Pass MA4199 Honours Project in Mathematics  
9. Pass four modules from List AM4-MMDA  
10. Pass two additional modules from List IV                                                                                           | 36-37*    | 100-106*             |
| UROPS        | At most one Mathematics UROPS module may be used to fulfil the requirements of Major in Mathematics                                                                                                              |           |                      |
To be awarded a \textbf{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 \textbf{List I}  
2. Pass CS1010/CS1010E/CS1010S/CS1010FC/CS1101S* Programming Methodology  
\*CS1101S (5MCs) may be read as an alternative to CS1010% (4MCs) to facilitate relevant programmes, e.g. Double Degree Programme with School of Computing. Registration for this module is subject to host availability. | 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 \textbf{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 \textbf{List AM3-ORFM}  
7. Pass two additional modules from \textbf{List III, IV} | 24-27* | 64-70* |
| 4000         | 8. Pass MA4199 Honours Project in Mathematics  
9. Pass four modules from \textbf{List AM4-ORFM}  
10. Pass two additional modules from \textbf{List IV} | 36-37* | 100-106* |

\textbf{UROPS}  
At most one Mathematics UROPS module may be used to fulfil the requirements of Major in Mathematics

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

\textbf{List II}  
- All MA modules at level 2000, except those coded MA23XX  
- PC2130 Quantum Mechanics I  
- PC2132 Classical Mechanics  
- ST2132 Mathematical Statistics
List III

- All MA modules at level 3000, except MA3311 and MA3312
- CS3230 Design & Analysis of Algorithms
- CS3234 Logic and Formal Systems
- CS4232 Theory of Computation
- 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
- CS4236 Cryptography Theory and Practice
- CS5230 Computational Complexity
- CS5237 Computational Geometry and Applications
- EC4301 Microeconomic Analysis III
- EC5104/EC5104R 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
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

**AM4-ORFM**

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

**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>64-70* MC</td>
<td>100-106* MC</td>
</tr>
<tr>
<td>Unrestricted Free Electives</td>
<td>32-18*MC</td>
<td>36-18*MC</td>
</tr>
<tr>
<td>Total</td>
<td>120 MC</td>
<td>160 MC</td>
</tr>
</tbody>
</table>

^Adjusted Level and Cumulative Major MCs respectively if taking MA2104 to fulfil List I.

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*Updated 24 Feb 2017
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Updated 16 May 2018
Updated 11 Sep 2019