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

**Graduation Requirements for students admitted in AY2014/15**

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. |
| 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** |
| 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** |
| 4000         | 8. Pass MA4199 Honours Project in Mathematics  
               9. Pass four modules from **List AM4**  
               10. Pass two additional modules from **List IV** |
| 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](#)  
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-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 | | |

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[Note: Lists and modules mentioned above would typically be detailed in the actual course catalog or equivalent. The placeholders [List I], [List II], [List III], [List IV], [AM3-MMDA], [AM4-MMDA] are used to indicate where these lists or modules are defined or can be found in the provided material.]
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>
<tbody>
<tr>
<td>1000</td>
<td>1. Pass the 4 modules in List I</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>2. Pass CS1010/CS1010E/CS1010S/CS1010FC/CS1101S* Programming Methodology</td>
<td>(^16)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*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.</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>3. Pass all the following modules:</td>
<td>20-23</td>
<td>40-43</td>
</tr>
<tr>
<td></td>
<td>• MA2101/MA2101S Linear Algebra II</td>
<td>(^24-27)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MA2108/MA2108S Mathematical Analysis I</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MA2213 Numerical Analysis I</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MA2216/ST2131 Probability</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Pass one additional module from List II, III, IV</td>
<td>20-23</td>
<td>40-43</td>
</tr>
<tr>
<td>3000</td>
<td>5. Pass all the following modules:</td>
<td>24-27*</td>
<td>64-70*</td>
</tr>
<tr>
<td></td>
<td>• MA3110/MA3110S Mathematical Analysis II</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MA3111/MA3111S Complex Analysis I</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Pass two modules from List AM3-ORFM</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. Pass two additional modules from List III, IV</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td>8. Pass MA4199 Honours Project in Mathematics</td>
<td>36-37*</td>
<td>100-106*</td>
</tr>
<tr>
<td></td>
<td>9. Pass four modules from List AM4-ORFM</td>
<td>36-37*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10. Pass two additional modules from List IV</td>
<td>36-37*</td>
<td></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>36-37*</td>
<td></td>
</tr>
</tbody>
</table>

**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
### 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
- EC4101/EC4301* Microeconomics 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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