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

Graduation Requirements for students admitted in AY2019/2020

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>
<tbody>
<tr>
<td>1000</td>
<td>1. Pass all the following modules:</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>- MA1100 Basic Discrete Mathematics or CS1231/CS1231S Discrete Structures</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MA1101R Linear Algebra I</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MA1102R Calculus</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- CS1010/CS1010E/CS1010S/CS1010X/CS1101S Programming Methodology</td>
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</tr>
<tr>
<td>2000</td>
<td>2. Pass all the following modules:</td>
<td>24-27</td>
<td>40-43</td>
</tr>
<tr>
<td></td>
<td>- MA2101/MA2101S Linear Algebra II</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MA2104 Multivariable Calculus</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- MA2108/MA2108S Mathematical Analysis I</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MA2213 Numerical Analysis I</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- MA2216/ST2131 Probability</td>
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<tr>
<td></td>
<td>- Pass one additional module from List II, III, IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>4. Pass three modules from List AM3</td>
<td>20-23</td>
<td>60-66</td>
</tr>
<tr>
<td></td>
<td>5. Pass two additional modules from List III, IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4000</td>
<td>6. Pass MA4199 Honours Project in Mathematics</td>
<td>32-33</td>
<td>92-98</td>
</tr>
<tr>
<td></td>
<td>7. Pass four modules from List AM4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Pass one additional module from List IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UROPS</td>
<td>At most one Mathematics UROPS module may be used to fulfil the requirements of</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>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 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 all the following modules:  
  - MA1100 Basic Discrete Mathematics or CS1231/CS1231S Discrete Structures  
  - MA1101R Linear Algebra I  
  - MA1102R Calculus  
  - CS1010/CS1010E/CS1010S/CS1010X/CS1101S Programming Methodology  
  | 16 | 16 |
| 2000         | 2. Pass all the following modules:  
  - MA2101/MA2101S Linear Algebra II  
  - MA2104 Multivariable Calculus  
  - MA2108/MA2108S Mathematical Analysis I  
  - MA2213 Numerical Analysis I  
  - MA2216/ST2131 Probability  
  - 3. Pass one additional module from **List II, III, IV**  
  | 24-27 | 40-43 |
| 3000         | 4. Pass three modules from **List AM3(A)**  
  5. Pass two additional modules from **List III, IV**  
  | 20-23 | 60-66 |
| 4000         | 6. Pass MA4199 Honours Project in Mathematics  
  7. Pass four modules from **List AM4(A)**  
  8. 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 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 all the following modules:  
  - MA1100 Basic Discrete Mathematics or 
  - CS1231/CS1231S Discrete Structures  
  - MA1101R Linear Algebra I  
  - MA1102R Calculus  
  - CS1010/CS1010E/CS1010S/CS1010X/CS1101S Programming Methodology | 16 | 16 |
| 2000         | 2. Pass all the following modules:  
  - MA2101/MA2101S Linear Algebra II  
  - MA2104 Multivariable Calculus  
  - MA2108/MA2108S Mathematical Analysis I  
  - MA2213 Numerical Analysis I  
  - MA2216/ST2131 Probability  
  3. Pass one additional module from [List II, III, IV] | 24-27 | 40-43 |
| 3000         | 4. Pass three modules from List [AM3(B)]  
  5. Pass two additional modules from [List III, IV] | 20-23 | 60-66 |
| 4000         | 6. Pass MA4199 Honours Project in Mathematics  
  7. Pass four modules from List [AM4(B)]  
  8. 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 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 those coded MA33XX
- BSE3703 Econometrics for Business I
- CS3230 Design & Analysis of Algorithms
- CS3234 Logic and Formal Systems
- 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/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 2 baskets AM3(A) and AM3(B).

AM3(A)
- MA3220 Ordinary Differential Equations
- MA3227 Numerical Analysis II
- MA3233 Combinatorics and Graph II
- MA3264 Mathematical Modelling
- ST3131 Regression Analysis

AM3(B)
- MA3236 Nonlinear Programming
- MA3238/ST3236 Stochastic Processes I
- MA3252 Linear and Network Optimization
- MA3269 Mathematical Finance I
- ST3131 Regression Analysis

List AM4

List AM4 consists of the following 2 baskets AM4(A) and AM4(B).

AM4(A)
- MA4229 Fourier Analysis and Approximation
- MA4230 Matrix Computation
- MA4255 Numerical Methods in Differential Equations
- MA4261 Coding and Cryptography
- MA4268 Mathematics for Visual Data Processing
- MA4270 Data Modelling and Computation

AM4(B)
- MA4235 Topics in Graph Theory
- 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>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.

*Published 1 July 2019*