3.4.2.4 Second Major in Mathematics

Arising from the recent revamp of the Engineering Mathematics curriculum, the Department of Mathematics has introduced four new modules MA1511 Engineering Calculus (2 MCs), MA1512 Differential Equations for Engineering (2 MCs), MA1513 Linear Algebra with Differential Equations (2 MCs) and MA1508E Linear Algebra for Engineering (4 MCs) to be offered from AY2017/18, for which students in different engineering departments will take prescribed combinations to suit their need. To allow flexibility for students from the Faculty of Engineering and other schools and faculties to take a Second Major in Mathematics, it is necessary to revise the relevant parts of the requirements of the programme.

To be awarded a BSc with a second major in Mathematics, candidates must satisfy at least 48 MCs from non-overlapping modules of the following:
<table>
<thead>
<tr>
<th>MODULE LEVEL</th>
<th>SECOND MAJOR REQUIREMENTS</th>
<th>CUMULATIVE MAJOR MCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level-1000</td>
<td></td>
<td>16 - 18</td>
</tr>
<tr>
<td>(16 - 18 MCs)</td>
<td>Pass</td>
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<tr>
<td></td>
<td>MA1100 Fundamental Concepts of Mathematics</td>
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<tr>
<td></td>
<td>or CS1231 Discrete Structures</td>
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<tr>
<td></td>
<td>or MA1101R Linear Algebra I</td>
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<td></td>
<td>or MA1506 Mathematics II</td>
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<tr>
<td></td>
<td>or MA1508 Linear Algebra with Applications</td>
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<tr>
<td></td>
<td>or MA1508E Linear Algebra for Engineering</td>
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<tr>
<td></td>
<td>or (MA1513 Linear Algebra with Differential Equations and one additional module from List II)</td>
<td></td>
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<tr>
<td></td>
<td>MA1102R Calculus</td>
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<tr>
<td></td>
<td>or MA1505 Mathematics I</td>
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<td></td>
<td>or MA1507 Advanced Calculus</td>
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<td></td>
<td>or MA1521 Calculus for Computing</td>
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<tr>
<td></td>
<td>or (MA1511 Engineering Calculus and MA1512 Differential Equations for Engineering)</td>
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<tr>
<td></td>
<td>MA1104/MA2104 Multivariable Calculus</td>
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<td></td>
<td>or MA2501 Differential Equations and Systems</td>
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<tr>
<td>MODULE LEVEL</td>
<td>SECOND MAJOR REQUIREMENTS</td>
<td>CUMULATIVE MAJOR MCS</td>
</tr>
<tr>
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</tbody>
</table>
| Level-2000 (16 – 19 MCs) | Pass  
MA2101/ Linear Algebra II  
MA2101S  
MA2108/ Mathematical Analysis I  
MA2108S  
MA2216/ Probability  
ST2131  
One additional module from List II, III, IV | 32 – 37 |
| Level-3000 & Level-4000 (16 – 19 MCs) | Pass  
MA3110/ Mathematical Analysis II  
MA3110S  
MA3111/ Complex Analysis I  
MA3111S  
Two additional modules from List III, IV | 48 – 56 |

**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  
- 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
• EC4101/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

This second major is **not** offered with a primary major in Applied Mathematics, Mathematics, Quantitative Finance or Data Science and Analytics, and minor in Mathematics or Financial Mathematics.