NUS | Department of Mathematics
Faculty of Science

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

Graduation Requirements for students admitted in AY2020/2021

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:

Course Level	Major Requirements	Level Units	Cumulative Major Units
1000	1. Pass all the following Courses: • MA1100/MA1100T Basic Discrete Mathematics or CS1231/CS1231S Discrete Structures • MA1101R/MA2001 Linear Algebra I • MA1102R/MA2002 Calculus • CS1010/CS1010E/CS1010S/CS1010X/CS1101S Programming Methodology	16	16
2000	2. Pass all the following Courses: • MA2101/MA2101S Linear Algebra II • MA2104 Multivariable Calculus • MA2108/MA2108S Mathematical Analysis I • MA2213 Numerical Analysis I • MA2216/MA2116/ST2131 Probability 3. Pass one additional course from List II, III, IV	24-27	40-43
3000	4. Pass three modules from List AM3 5. Pass two additional courses from List III, IV	20-23	60-66
4000	6. Pass MA4199 Honours Project in Mathematics 7. Pass four courses from List AM4 8. Pass one additional course from List IV	32-33	92-98
UROPS	At most one Mathematics UROPS module may be used to fulfil the requirements of Major in Applied 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:

Module Level	Major Requirements	Level MCs	Cumulative Major MCs
1000	1. Pass all the following modules: • MA1100/MA1100T Basic Discrete Mathematics or CS1231/CS1231S Discrete Structures • MA1101R/MA2001 Linear Algebra I • MA1102R/MA2002 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/MA2116/ST2131 Probability 3. Pass one additional module from List II, III, IV	24-27	40-43
3000	4. Pass three modules from List AM3, of which at least one 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 Applied 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:

Module Level	Major Requirements	Level MCs	Cumulative Major MCs
1000	1. Pass all the following modules: • MA1100/MA1100T Basic Discrete Mathematics or CS1231/CS1231S Discrete Structures • MA1101R/MA2001 Linear Algebra I • MA1102R/MA2002 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/MA2116/ST2131 Probability 3. Pass one additional module from List II, III, IV	24-27	40-43
3000	4. Pass three modules from List AM3, of which at least one 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 Applied 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
- CS3231 Theory of Computation
- 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, except MA5232 and MA5266
- 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
- PC5274 Advanced Mathematical Methods in Physics
- 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
- QF4103 Mathematical Models of Financial Derivatives
- ST4245 Statistical Methods for Finance

*CS4232 has been recoded to CS3231 (which is in List III) wef AY2020/21 Sem 2

Modular Credit Cumulative Table		
Requirements	**B.Sc.**	**B.Sc. (Hons)**
University Requirements	20 MC	20 MC
Faculty Requirements	4-8 MC*	4-12 MC*
Major Requirements	60-66 MC	92- 98 MC
Unrestricted Free Electives	26-36 MC	30-44 MC
Total	**120 MC**	**160 MC**

*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.

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