

Mathematical Sciences Programme Curriculum
For CN Yang Scholars admitted in AY 2012/2013 onwards

AU Requirement

Course Type	AU	Actual	BA track
Core Courses	51	49	53
Major Prescribed Electives	33	33	33
GER-Core	12	12	12
GER-PE AHSS	3	3	3
GER-PE LS	3	3	3
GER-PE BM	3	3	3
GER-PE STS	3	3	3
GER-PE ANY from AHSS, LS, BM or STS	3	3	3
Unrestricted Electives (UE)	21	23	23
Total	132	132	136

Common Compulsory Courses in CN Yang Scholars Programme

Year 1

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
CY1001	Introductory Biology	4	1			Will be transferred as UE/GER-PE STS at the end of Year 2 Sem 1
CY1101	Principles of Modern Chemistry	4	1		CBC113	Will be transferred as UE/GER-PE STS at the end of Year 2 Sem 1
CY1102	Fundamental Techniques of Experimental Chemistry and Biological Chemistry	3	1			You may read either CY1102 or CY1304 but not both Will be transferred as UE at the end of Year 2 Sem 1
CY1400	C N Yang Scholars Programme Undergraduate Research Experience	3	2			Will be transferred as UE/GER-PE STS at the end of Year 2 Sem 1
CY1201	Calculus of One Variable	4	1			Will be transferred as Core at the end of Year 2 Sem 1
CY1202	Calculus of Several Variables	4	2	CY1201	MAS182, MAS211, MAS212, MTH113, MTH211	Will be transferred as Core at the end of Year 2 Sem 1
CY1301	Mechanics	4	1	H2 or A Level Physics	PAP111, PAP181	Will be transferred as UE/GER-PE STS at the end of Year 2 Sem 1
CY1302	Electromagnetism and Relativity	4	2	H2 or A Level Physics	PAP112, PAP182	Will be transferred as UE/GER-PE STS at the end of Year 2 Sem 1
CY1304	Physics Lab 1	3	1			You may read either CY1102 or CY1304 but not both Will be transferred as UE at the end of Year 2 Sem 1

Year 2

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
CY1203	Linear Algebra and Differential Equations	4	1	CY1202	MAS114, MAS183, MAS213, MTH114, MTH115	Will be transferred as Core at the end of Year 2 Sem 1
CY1303	Waves and Quantum Mechanics	4	1	H2 or A Level Physics	PAP211	Will be transferred as UE/GER-PE STS at the end of Year 2 Sem 1

Note: CY1201, CY1202, CY1203 will replace MH1100, MH1101, MH1200, MH1201, MH2100 in the Mathematical Sciences programme requirement

GER Core Courses in Mathematical Sciences Programme

Year 1

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
HW0303	Mastering Communication	3	2	Exempted or Pass in QET or HW0001 (co-requisite)		Pass/Fail graded

Year 2

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
HW0203	Research Writing in the Physical and Mathematical Sciences	3	2	Exempted or Pass in QET or HW0001 (co-requisite)		
PS8001	Defence Science	3	2			Pass/Fail graded

Year 3

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
	Environmental Sustainability	3	1 or 2			Pass/Fail graded

Environmental Sustainability

Major Core Courses in Mathematical Sciences (Pure Mathematics) Programme

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
MH1402	Algorithms and Computing II	2	2	MH1401		
MH1300	Foundations of Mathematics	4	1		MTH111	
MH1301	Discrete Mathematics	3	2		MTH116	
MH2200	Groups and Symmetries	3	1	MH1200		
MH2401	Algorithms and Computing III	2	1	MH1100, MH1101, MH1200, MH1401, MH1402	MTH213	
MH2500	Probability and Introduction to Statistics	4	1	MH1100, MH1101	MTH214	
MH3100	Real Analysis I	4	2	MH1100, MH1101	MTH311	
MH3110	Ordinary Differential Equations	4	2	MH2100	MTH316	
MH3101	Complex Analysis	4	1	MH1101, MH2100	MTH312	
MH3600	Knots and Surfaces: Introduction to Topology	4	1	MH2100, MH2200	MTH313	
MH3200	Abstract Algebra I	3	2	MH1300, MTH1201, MH2200	MTH321	

Major Core Courses in Mathematical Sciences (Applied Mathematics) Programme

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
MH1402	Algorithms and Computing II	2	1	MH1401		
MH1300	Foundations of Mathematics	4	1		MTH111	
MH1301	Discrete Mathematics	3	2		MTH116	
MH2200	Groups and Symmetries	3	1	MH1200		
MH2401	Algorithms and Computing III	2	1	MH1100, MH1101, MH1200, MH1401, MH1402		
MH2500	Probability and Introduction to Statistics	4	1	MH1100, MH1101	MTH214	
MH3100	Real Analysis I	4	2	MH1100, MH1101	MTH311	
MH3110	Ordinary Differential Equations	4	2	MH2100	MTH316	
MH3101	Complex Analysis	4	1	MH1101, MH2100	MTH312	
MH3700	Numerical Analysis I	3	2	MH1100, MH1101	MTH317	
MH3701	Basic Optimization	4	2	MH1201	MTH336	

Major Core Courses in Mathematical Sciences (Statistics) Programme

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
MH1402	Algorithms and Computing II	2	1	MH1401		
MH1300	Foundations of Mathematics	4	1		MTH111	
MH1301	Discrete Mathematics	3	2		MTH116	
MH2200	Groups and Symmetries	3	1	MH1200	MTH212	
MH2401	Algorithms and Computing III	2	1	MH1100, MH1101, MH1200, MH1401, MH1402		
MH2500	Probability and Introduction to Statistics	4	1	MH1100, MH1101	MTH214	
MH3100	Real Analysis I	4	2	MH1100, MH1101	MTH311	
MH3110	Ordinary Differential Equations	4	2	MH2100	MTH316	
MH3500	Statistics	4	2	MH2500	MTH351	
MH3510	Regression Analysis	4	1	MH2500, MH3500	MTH352	
MH3511	Data Analysis With Computer	3	2	MH2500	MTH353	

Major Core Courses in Mathematical Sciences (Business Analytics) Programme

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
MH1402	Algorithms and Computing II	2	1	MH1401		
MH1300	Foundations of Mathematics	4	1		MTH111	
MH1301	Discrete Mathematics	3	2		MTH116	
MH2401	Algorithms and Computing III	2	1	MH1100, MH1101, MH1200, MH1401, MH1402		
MH2500	Probability and Introduction to Statistics	4	1	MH1100, MH1101	MTH214	
MH3100	Real Analysis I	4	2	MH1100, MH1101	MTH311	
MH3110	Ordinary Differential Equations	4	2	MH2100	MTH316	
MH3400	Algorithms for the Real World	4	2			
MH3500	Statistics	4	2	MH2500	MTH351	
MH3511	Data Analysis With Computer	3	2	MH2500	MTH353	
BE1401	Business Operations and Processes	4				

BU8601	Fundamentals of Management	3				
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Major Prescribed Electives in Mathematical Sciences (Pure Mathematics) Programme

25 AU in total (at least 18 AU at level 4 or higher), including the following:

Choose at least 3 of the following lists and at least 2 from each chosen list (except P4 where only 1 course can be chosen)

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
List P1						
MH4100	Real Analysis II	4	2	MH2100, MH3100	MTH411	
MH4600	Algebraic Topology	4	2	MH3200, MH4100	MTH412	
MH4601	Differential Geometry	4	1	MH4100, MH4600	MTH413	
MAS710	Continuous Methods	4	2	Approval by the Division		
List P2						
MH3210	Number Theory	4	1	MH1300	MTH322	
MH4200	Abstract Algebra II	4	1	MH1201, MH3200	MTH422	
MH4301	Set Theory and Logic	4	2	MH1300, MH1301	MTH424	
MAS712	Algebraic Methods	4	1	Approval by the Division		
CSC412	Formal Languages, Automata and Computability	4				
List P3						
MH4310	Coding Theory	4	2	MH1201, MH1301	MTH426	
MH4311	Cryptography	4	1	MH1301, MH3200	MTH427	
MH4300	Combinatorics	4	2	MH1101, MH1201, MH1301	MTH431	
MAS711	Discrete Methods	4	2	Approval by the Division		
MAS714	Algorithms and Theory of Computing	4	2	Approval by the Division		
List P4						
MH4900	Honours Project	8	1 or 2	Approval by the Division	MTH491	
MH4901	Industrial Internship	8	S & T	Approval by the Division	MTH492	Pass/Fail graded
Remaining AU can be from any MH3XXX, MH4XXX, MAS71X courses						

Note: The semester offering for each course may be adjusted from time to time, Semester S and T stand for Special Term I and II

Major Prescribed Electives in Mathematical Sciences (Applied Mathematics) Programme

25 AU in total (at least 18 AU at level 4 or higher), including the following:

Choose at least 3 of the following lists and at least 2 from each chosen list (except A5 where only 1 course can be chosen)

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
List A1						
MH4100	Partial Differential Equations	4	2	MH3100, MH3110	MTH416	
MH4700	Numerical Analysis II	4	1	MH1200, MH2100, MH3110, MH3700	MTH417	
MH4711	Mathematical Modeling in Imaging, Vision and Graphics	4	1	MH2100, MH3700, MH4110	MTH418	
MH4730	Mathematics in Biology and Medicine	4	2	MH2500	MTH419	
MAS710	Continuous Methods	4	2	Approval by the Division		
MP4A07	Finite Element Method for Engineering Applications	3	2	MP4011		
CSC414	Geometric Modelling	4	N/A			
CSC417	Introductory Bioinformatics	4	N/A			
EE4476	Image Processing	3	1			
List A2						
MH4310	Coding Theory	4	2	MH1201, MH1301	MTH426	
MH4311	Cryptography	4	1	MH1301, MH3200	MTH427	
MH4300	Combinatorics	4	2	MH1101, MH1201, MH1301	MTH431	
MAS711	Discrete Methods	4	2	Approval by the Division		
CSC422	Neural Networks	4				
List A3						
MH4701	Mathematical Programming	4	1	MH2100, MH3701	MTH436	
MH4702	Probabilistic Methods in OR	4	1	MH2500, MH3701	MTH437	
MH3310	Mathematical Foundations of Game Theory	4	2	MH2500	MAS371, HE302	
MAS714	Algorithms and Theory of Computing	4	2	Approval by the Division		
CSC202	Algorithms	4	1	CSC105, MAS111, MAS214		
CSC401	Advanced Algorithms	4	1			
List A4						
PAP352	Chaotic Dynamical Systems	4	2	PAP221		
PAP353	Fluid Mechanics	4	1	PAP221		
PAP452	Atmospheric Physics	4	N/A	PAP213, PAP353		
PAP454	Nuclear Physics	4	1	PAP311		
List A5						
MH4900	Honours Project	8	1 or 2	Approval by the Division	MTH491	
MH4901	Industrial Internship	8	S & T	Approval by the Division	MTH492	Pass/Fail graded
Remaining AU can be from any MH3XXX, MH4XXX, MAS71X courses						

Note: The semester offering for each course may be adjusted from time to time, Semester S and T stand for Special Term I and II

Major Prescribed Electives in Mathematical Sciences (Statistics) Programme

25 AU in total (at least 18 AU at level 4 or higher), including the following:

Choose at least 6 courses from the following lists (or 5 courses if S4 is included), including at least 2 courses from list S1 and 2 courses from list S3

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
List S1						
MH3512	Stochastic Processes	4	1	MH2500	MTH354	
MH4500	Time Series Analysis	4	2	MH2500, MH3500, MH3510	MTH451	
MH4501	Multivariate Analysis	4	2	MH2500, MH3500, MH3510	MTH452	
MAS713	Mathematical Statistics	4	1	Approval by the Division		
List S2						
MH4730	Mathematics in Biology and Medicine	4	2	MH2500	MTH419	
MH4510	Data Mining	4	1	MH2500, MH3500, MH3510, MH3511	MTH453	
MH4511	Sampling & Survey	4	1	MH2500, MH3500	MTH454	
MH4512	Clinical Trials	4	2	MH2500, MH3500, MH3510, MH3511	MTH455	
MH4513	Survival Analysis	4	1	MH2500, MH3500, MH3510	MTH456	
BA2202	Mathematics of Finance	4	1		BA214, MR218	
BA3202	Actuarial Statistics	4	2	MH3500, MAS317	BA307	
CSC417	Introductory Bioinformatics	4				
HE322	Econometric Modeling & Forecasting	4	2	HE191/AB106, HE204A/HE204B		
HE421	Advanced Econometrics	4	2	HE321		
List S3						
MH3701	Basic Optimization	4	2	MH1201	MTH336	
MH3310	Mathematical Foundations of Game Theory	4	2	MH2500	MAS371, HE302	
MH4701	Mathematical Programming	4	1	MH2100, MH3701	MTH436	
MH4702	Probabilistic Methods in OR	4	1	MH2500, MH3701	MTH437	
MH4320	Computational Economics	4	1	MH1301	MTH461	
MAS714	Algorithms and Theory of Computing	4	2	Approval by the Division		
List S4						
MH4900	Honours Project	8	1 or 2	Approval by the Division	MTH491	
MH4901	Industrial Internship	8	S & T	Approval by the Division	MTH492	Pass/Fail graded
Remaining AU can be from any MH3XXX, MH4XXX, MAS71X courses						

Note: The semester offering for each course may be adjusted from time to time, Semester S and T stand for Special Term I and II

Major Prescribed Electives in Mathematical Sciences (Business Analytics) Programme

25 AU in total (at least 18 AU at level 4 or higher), including the following:

Choose at least 6 courses from the following lists (or 5 courses if B4 is included), including at least 3 courses from list B1 and 2 courses from list B2

Course Code	Course Title	AU	Sem	Prerequisites	Mutually Exclusive With	Remark
List B1 Statistics & Data Analysis						
MH3510	Regression Analysis	4	1	MH2500, MH3500	MTH352	
MH4500	Time Series Analysis	4	2	MH2500, MH3500, MH3510	MTH451	
MH4510	Data Mining	4	1	MH2500, MH3500, MH3510, MH3511	MTH453	
MH4513	Survival Analysis	4	1	MH2500, MH3500, MH3510	MTH456	
CZ2007	Database Systems	3		CZ1007		
CZ4031	Machine Learning	3				
CZ4033	Decision Support Systems	3				
CZ4021	Advanced Data Management	3				
CZ4025	Information Retrieval	3				
List B2 Business & Management						
AB0901	Principles of Economics	3				
BC2401	Systems Analysis & Design	4				
BC2402	Database Management & Business Intelligence	4				
BC2403	Project & Vendor Management	4				
BC2404	Financial Analytics & Reporting	4				
BC2405	Decision Tools for Managers	4				
BC3402	Information Systems in Financial Services	4				
List B3 OR/Optimization/Numerical Analysis						
MH3701	Basic Optimization	4	2	MH1201	MTH336	
MH3700	Numerical Analysis I	4	2	MH2500	MAS371, HE302	
MH4320	Computational Economics	4	1	MH1301	MTH461	
MH4700	Numerical Analysis II	4	1	MH1200, MH2100, MH3110, MH3700	MTH417	
MH3310	Mathematical Foundations of Game Theory	4	2	MH2500	MAS371, HE302	
MH4701	Mathematical Programming	4	1	MH2100, MH3701	MTH436	
MH4702	Probabilistic Methods in OR	4	1	MH2500, MH3701	MTH437	
List B4						
MH4900	Honours Project	8	1 or 2	Approval by the Division	MTH491	
MH4901	Industrial Internship	8	S & T	Approval by the Division	MTH492	Pass/Fail graded
Remaining AU can be from any MH3XXX, MH4XXX, MAS71X courses						