School of Mathematics, Statistics & Applied Mathematics
B.Sc. Mathematical Science

For 3rd year students Ac.Yr 2021/2022

B.Sc. Mathematical Science - 3BMS2					
3rd year			**Sem**	**Pre-requisites**	**Exclusion-requisites**
Students must take a minimum of 40ECTS from the following CORE OPTIONS, depending on students' interest					
MA341	Metric Spaces	Core Option	I		
MA3343	Groups	Core Option	I		
MA342	Topology	Core Option	II		
MA3491	Fields and Applications	Core Option	II		
MA385	Numerical Analysis I	Core Option	I		
MA378	Numerical Analysis II	Core Option	II		
MA3101	Euclidean and non-euclidean Geometry	Core Option	I		
MA2111	Anailís	Elective	II		
MA3991 † †	*Actuarial mathematics Cashflow models*	*Elective*	*I*	*Cycling modules, not available in 2021.22*	
MA3992†	Actuarial mathematics Life contingencies 1, pricing and reserving	Elective	I	Cycling modules, requires MA2993	
MA215	Mathematical Molecular Biology I	Elective	I		
MA216	Mathematical Molecular Biology II	Elective	II		
MP305	Modelling I	Core Option	I		
MP307	Modelling II	Core Option	II		
MP345	Mathematical Methods I	Core Option	I		
MP346	Mathematical Methods II	Core Option	II		
MP491	Non-Linear Systems	Core Option	II		
MP356††	*Quantum Mechanics I*	*Core Option*	*I*	*2yr Cycle, requires [MP231 & MP232]*	
MP357††	*Quantum Mechanics II*	*Core Option*	*II*	*2yr Cycle, requires [MP231 & MP232]*	
MP410††	*Non-Linear Elasticity*	*Core Option*	*I*	*2yr Cycle, requires [MP231 & MP232]*	
MP366†	Electromagnetism	Core Option	I	2yr Cycle, requires [MP231 & MP232]	
MP494†	Partial Differential Equations	Core Option	I	2yr Cycle, requires [MP231 & MP232]	
MP365†	Fluid Mechanics	Core Option	II	2yr Cycle, requires [MP231 & MP232]	
ST313	Applied Regression Models	Core Option	I	ST2004 (or disc.ST236)	
ST4020	Causal Inference	Elective	II	ST313	
MA461	Probabilistic Models for Molecular Biology	Elective	I		
CS3304	Logic	Elective	I		
CS319	Scientific Computing	Elective	II		
CT3535	Object Orientated Programming III	Elective	I		
CT511	Databases	Elective	I		
CT2108	Networks and Data Communications 1	Elective	II		
CT411	Multi-media Development	Elective	II		
PH222	Astrophsyical Concepts	Elective	I		
PH328	Physics of the Environment I	Elective	I		
PH329	Physics of the Environment II	Elective	II		
PH362	Stellar Astrophsyics	Elective	II		
* Syllabus structure of any future years may be subject to change due to ongoing annual syllabus review.					
†† Offered on a 2yr Cycle, next available in 2020.21, † Offered on a 2yr Cycle, next available in 2021.22					

B.Sc. Mathematical Science - 4BMS2					
4th year			**Sem**	**Pre-requisites**	**Exclusion-requisites**
Students are registered for Final Year Project					
MM4000	Final Year Project (10ECTS)		I+II		
Students must take a minimum of 30ECTS from the following CORE OPTIONS, depending on students' interest					
MA490	Measure Theory	Core Option	I	MA341 & MA342	
MA416	Rings	Core Option	I	MA343 & MA344	
MA482	Functional Analysis	Core Option	II	MA341 & MA342	
MA4344	Advanced Group Theory	Core Option	II		
MA3491	Fields and Applications	Elective	II	MA343 & MA344	
MA385	Numerical Analysis I	Elective	I		
MA378	Numerical Analysis II	Elective	II		
MA3101	Euclidean and non-euclidean Geometry	Elective	I		
MA437	Introduction to Mathematical Research Topics I	Elective	I		
MA438	Introduction to Mathematical Research Topics II	Elective	II		
MA3991††	Actuarial mathematics Cashflow models	Elective	I	Cycling modules, requires MA2993	
MA3992 †	*Actuarial mathematics Life contingencies 1, pricing and reserving*	*Elective*	*I*	*Cycling modules, not available in 2022.23*	
MA495	Actuarial Mathematics: Life Contingencies II	Elective	II	MA311 (or equiv) & MA341 & MA490	
MA418	Differential Equations With Financial Derivatives	Elective	II	MA495	
MA4101	Teaching and Learning in Mathematics	Elective	I+II		
MA215	Mathematical Molecular Biology I	Elective	I		
MA216	Mathematical Molecular Biology II	Elective	II		
MA4102	Algebraic Foundations of Quantum Computing	Elective	I		
MP305	Modelling I	Core Option	I	[MP231 & MP232]	
MP307	Modelling II	Core Option	II	[MP231 & MP232]	
MP345	Mathematical Methods I	Core Option	I	[MP231 & MP232]	
MP346	Mathematical Methods II	Core Option	II	[MP231 & MP232]	
MP403	Cosmology And General Relativity	Core Option	I	[MP231 & MP232]	
MP491	Non-Linear Systems	Core Option	II	[MP231 & MP232]	
MP356††	Quantum Mechanics I	Core Option	I	2yr Cycle, requires [MP231 & MP232]	
MP357††	Quantum Mechanics II	Core Option	II	2yr Cycle, requires [MP231 & MP232]	
MP410††	Non-Linear Elasticity	Core Option	I	2yr Cycle, requires [MP231 & MP232]	
MP366†	*Electromagnetism*	*Core Option*	*I*	*2yr Cycle, not available*	
MP494†	*Partial Differential Equations*	*Core Option*	*I*	*2yr Cycle, not available*	
MP365†	*Fluid Mechanics*	*Core Option*	*II*	*2yr Cycle, not available*	
ST417	Introduction to Bayesian Modelling	Core Option	I		
ST413	Statistical Modelling	Core Option	I	ST313	
ST4040	Modern Statistical Methods	Core Option	II	ST413	
ST4020	Causal Inference	Elective	II	ST313	
MA461	Probabilistic Models for Molecular Biology	Elective	I		
CS424	Object Oriented Programming/Internet Programming	Elective	I	CS319	
CS402	Cryptography	Elective	II		
CS4423	Networks	Elective	II		
CS3304	Logic	Elective	I		
CS319	Scientific Computing	Elective	II		
CS4102	Geometric Foundations in Data Science I	Elective	II		
CS4103	Geometric Foundations in Data Science II	Elective	II		
CT318	Object Orientated Programming III	Elective	I		
CT336	Graphics and Image Processing	Elective	I	CS319	
CT4101	Machine Learning	Elective	I		
CT865	Human Computer Interaction	Elective	I	CS209, CS211, CT232, CT233	
CT548	Object Oriented Software Design & Development	Elective	II		
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