MAS eCampus



ERSITY

Bachelor of Science in Mathematical Sciences, With IT eLearning Programme

SCHOOL OF MATHEMATICS AND APPLIED STATISTICS





1. Introduction

Bachelor of Science programme in Mathematical Sciences offers a flexible degree course with IT which provides a mathematical foundation in Pure Mathematics, Applied mathematics, Statistics, and Actuarial Science.

The first years ensure that students will have a solid foundation. The flexibility offered in the later years allows the students to adapt their degree according to their own interests, ambitions and ability.

This degree program is designed to engage with and complement the existing programs of Applied Statistics and Actuarial Science offered by the school.

2. Objectives:

The main objectives of this programme are to: (a) Equip the student with a solid mathematical foundation.

(b) Give a flexible program that informs the student about different mathematical disciplines, such as Pure Mathematics, Applied mathematics, Statistics, and Actuarial Science.

(c) Give students the opportunity to receive training which prepares them for:

i. Postgraduate studies and research in mathematics.

ii. A career in applied statistics.

iii. A career in actuarial science.

iv. Employment in scientific, banking or business areas requiring mathematical or statistical background.

3. Admission Requirements.

A student wishing to study Mathematics must satisfy the minimum University requirements and Faculty of Science regulations. A student must have passed Mathematics in the KCSE with a minimum grade of C+.



4. Programme Structure

(a) In the first year, students will take 14 core units in the department. In the second year they will take 6 core units and in the third year 4.

(b) The students will take at least the equivalent of 4 IT units for each year of study. These may be SMI units offered by the department.

(c) In all years the department will offer elective courses. Students will choose elective courses in line with their desired area of specialisation.

(d) Students may also choose exceptional electives offered by other departments subject to approval by the department and the hosting department.

(e) In all years a minimum of 10 units must be taken in the department.

5. Examinations

(a) The University and Faculty of Science common examination regulations shall apply.

(b) Examinations shall be held at the end of the semester in which the courses are taught.

6. Duration of the Programme

(a) The duration of the programme shall normally extend over a period of four academic years.



(b) The courses are offered in units in which a course unit is defined as three hour lecture or equivalent per week.

(c) A student will take a minimum of 14 and a maximum of 16 units in each year of study. Students wishing to take more than 16 units will require Senate approval.

7. Course Key

- C CORE
- R REQUIRED
- E ELECTIVE

8. Modules Distribution

First Year

	FIRST	I SEMESTER	
SMA	100	Basic Mathematics	1 C
SMA	101	Analytical Geometry	1 C
SMA	109	Foundation of Pure Mathematics	s 1 C
SAS	103	Introduction to Probability Theor	y1 C
SAC	101	Principles of Actuarial Science	1 C
SMI	101	Multimedia Introduction to	
		Statistics	1 C
SAS	101	Descriptive Statistics	1 E
SAC	103	Mathematical Modelling	1 E
AEC	101	Micro Economics	1 E
	SECC	ND SEMESTER	
SMA	102	Calculus I	1 C
SMA	103	Linear Algebra I	1 C
SMA	110	Foundation of Applied	
		Mathematics	1 C
SAS	102	Probability and Distribution	
		Theory I	1 C
SAC	102	Fundamentals of Actuarial	
		Mathematics I	1 C
SMI	103	Handling Data	1 C
SMI	104	Descriptive Statistical Analysis	
		and Presentation	1 C
SAS	104	Programming Methodology	1 E
SAS	106	Introduction to Biostatistics	1 E
SAC	104	Linear Models and Forecasting	1 E
SAC	106	Macroeconomics	1 E

Second Year

	FIRST SEMESTER				
SMA	200	Calculus II	1 C		
SMA	202	Vector Analysis	1 C		
SMA	203	Classical Mechanics	1 E		
SMA	205	Numerical Analysis I	1 C		
SMI	201	Statistical Computing I	1 C		
SMI	203	Collecting and organising data	1 C		
SAS	201	Sample Surveys	1 E		
SAS	203	Economic Statistics	1 E		
SAS	205	Statistical computing I	1 E		
SAS	207	Probability and Distribution			
		Theory II	1 E		
SAC	201	Financial Mathematics I	1 E		
SAC	203	Fundamentals of Actuarial			
		Mathematics II	1 E		

SECOND SEMESTER

SMA	201	Linear Algebra II	1	С
SMA	206	Algebraic Structure	1	С
SMA	208	Real Analysis I	1	С
SMA	204	Dynamics	1	Е
SMA	207	Calculus III	1	Е
SMA	209	Numerical Analysis II	1	Е
SMI	202	Data Management	1	С
SMI	204	ICT 2	1	С
SAS	202	Principles of Statistical Inference	1	Е
SAS	204	Demography and Social		
		Statistics	1	Е
SAC	202	Life Testing Analysis	1	Е
SAC	204	Theory of Interest	1	Е
SAC	206	Actuarial Mathematics I	1	Е
SAC	208	Risk Theory	1	Е
SAC	210	Investment and Asset		
		Management I	1	Е

Third Year

FIRST SEMESTER

SMA	300	Real Analysis II	1 E
SMA	301	Ordinary Differential Equations I	1 C
SMA	313	Fundamentals of Measure	
		Theory	1 C
SMA	305	Numerical Analysis III	1 E
SMA	307	Methods I	1 E
SMA	308	Fluid Mechanics I	1 E
SMI	301	Computer based survey	
		techniques	1 E
SMI	303	Computers applied to	
		Mathematics	1 E



SAS	301	Numerical Analysis I	1 E	SMA	412	Fluids Mechanics II	1 E
SAS	303	Estimation Theory	1 E	SMA	413	Methods II	1 E
SAS	305	Stochastic Processes I	1 E	SMA	417	Group Theory II	1 E
SAS	307	Theory of sampling Techniques	1 E	SMA	420	Operation Research II	1 E
SAS	309	Time Series Analysis and		SMI	401	Bayesian Modelling	Е
		Forecasting	1 E	SMI	403	Writing Macros	1 E
SAS	311	Statistical Demography I	1 E	SMI	405	Programming: Advanced	
SAS	313	Principles of Econometrics	1 E	-		objects and Data Structures	1 E
SAS	315	Statistical Genetics	1 E	SAS	401	Further Distribution Theory	1 E
SAC	301	Methods of Actuarial		SAS	403	Non Parametric methods	1 E
		Investigations I	1 E	SAS	405	Analysis of Experimental	
SAC	303	Actuarial Mathematics II	1 E			Designs II	1 E
SAC	305	Pension Mathematics	1 E	SAS	407	Further Time series Analysis	1 E
SAC	307	Financial Economics I	1 E	SAS	409	Further Sample Survey Theory	
						and Methods	1 E
	SECO	ND SEMESTER		SAS	411	Stochastic Decision Models II	1 E
SMA	303	Complex Analysis I	1 C	SAS	413	Stochastic Models for Biological	
SMA	314	Introduction to PDE	1 C			Processes	1 E
SMA	302	Linear Algebra III	1 E	SAS	415	Biometric Models	1 E
SMA	304	Group Theory	1 E	SAS	417	Statistical Demography II	1 E
SMA	306	Numerical Analysis IV	1 E	SAS	419	Econometric Models I	1 E
SMA	309	Real Analysis III	1 E	SAS	421	Stochastic Processes II	1 E
SMA	310	Dynamics II	1 E	SAS	423	Practical Statistics	1 E
SMA	311	Waves	1 E	SAS	425	Labour Dynamics	1 E
SMA	312	Operations Research I	1 E	SAS	427	Agricultural Indices	1 E
SMA	317	Industrial Attachment	1 E	SAS	429	Energy Analysis	1 E
SMI	302	Statistical Computing II	1 E	SAS	431	Teaching of Statistics	1 E
SMI	304	Introduction to object		SAC	401	Mathematics of Demography	
		oriented programming	1 E			& Graduation	1 E
SMI	306	Web design Project	1 E	SAC	403	Actuarial Life Contingencies II	1 E
SAS	302	Mathematical Methods	1 E	SAC	405	Investment and Asset	
SAS	304	Test of Hypotheses	1 E			Management II	1 E
SAS	306	Statistical Modelling	1 E	SAC	407	Principles of Financial	
SAS	308	Analysis of Experimental				Management	1 E
		Designs I	1 E	SAC	409	Project in Actuarial Science	1 E
SAS	310	Stochastic Decision Models I	1 E	SAC	411	Theory of Business decisions	1 E
SAS	312	Statistical Computing II	1 E	SAC	415	Survival Analysis	1 E
SAS	314	Research Methodology	1 E	•••••			
SAC	300	Financial Mathematics II	1 E	SECO	ND SEM	ESTER	
SAC	302	Methods of Actuarial		SMA	402	Measure Theory	1 E
•	••-	investigations II	1 E	SMA	414	Fourier Analysis	1 E
SAC	304	Actuarial Life Contingencies I	1 E	SMA	410	Functional Analysis	1 E
0,10		, lota and 2nd Contingencies i		SMA	407	Field Theory	1 E
Бони	th Var			SMA	408	Topology II	1 E
			\mathbf{V}	SMA	411	Partial Differential Equations II	1 E
				SMA	415	Fluid Mechanics III	1 E
FIRST SEMESTER				SMA	416	Galois Theory	1 E
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Algebraic Geometry

analysis

Numerical Analysis VI

Operations Research III

Problem based statistical

418

419

429

402

SMA

SMA

SMA

SMI

1 E

1 E

1 E

1 E

SMI	404	Algorithms	1 E	
SMI	406	Programming project		
SAS	402	Bayesian Inference and		
		Decision Theory	1 E	
SAS	408	Multivariate Methods	1 E	
SAS	406	Robust Methods and		
		Non-Parametrics	1 E	
SAS	410	Statistical Model Building	1 E	
SAS	412	Stochastic Models for Social		
		Processes	1 E	
SAS	414	Survey Research Methods	1 E	
SAS	416	Quality Control Methods	1 E	
SAS	418	Applied Population Analysis	1 E	
SAS	420	Applied demography	1 E	
SAS	422	Econometric Models II	1 E	
SAS	424	Applied Econometrics	1 E	
SAS	426	Statistical Computing III	1 E	
SAS	428	Response Surface		
		Méthodologies	1 E	
SAS	430	Educational Statistics	1 E	
SAS	432	Health Indicators	1 E	
SAS	434	Government Financing Struct	ure 1 E	
SAS	436	Environmental/Ecological		
		Indicators	1 E	
SAS	438	Statistical Organization	1 E	
SAC	402	Statistical Modelling II	1 E	
SAC	404	Computational Finance	1 E	
SAC	406	Risk and Credibility Theory	1 E	
SAC	408	Risk Mathematics	1 E	

