



MASENO UNIVERSITY
FOUNTAIN OF EXCELLENCE

eCampus



Education at your fingertips

Bachelor of Science in Actuarial Science, With IT eLearning Programme

SCHOOL OF MATHEMATICS AND APPLIED STATISTICS



ISO 9001:2008
CERTIFIED



1. Introduction

Mathematical models and simulations, and the interpretation of their results, are being called on increasingly in global decisions, as business, politics and management all become more quantitative in their methods. The application of mathematics is also in demand in the social sciences, particularly economics, where mathematical tools are used to formulate models of the complex interactions in an economic system.

The Actuarial Science degree programme prepares students for a rewarding career, both intellectually and financially. It opens doors to the wide range of careers available to maths graduates. Opportunities are available for a year out to participate in an industrial placement for all admitted students.

Although actuarial science is a separate discipline with its own area of knowledge, modern actuarial training requires multidisciplinary knowledge such as probability, statistics, economics, investment, finance, law, taxation, and accounting. The Actuarial Science curriculum reflects this by incorporating various interdisciplinary courses into the basic actuarial training.

2. Objectives

The BSc. Programme in Actuarial Science is set up to:

- i) develop in students, appreciation of actuarial methods, and of the links between the theory of the subjects and their practical application in industry;
- ii) develop in students, a logical, formal and quantitative approach to formulating and solving problems;
- iii) provide a foundation of knowledge about the financial sector and risk management;
- iv) provide students with a knowledge and skills base from which to develop further abilities to understand and analyse financial markets and institutions;
- v) form all rounded actuarial professionals with good grounding in the mathematical and statistical approaches;
- vi) provide a favourable teaching and learning environment for students to evolve, thrive and achieve their potential.
- vii) provide enough academic training for students who wish to pursue postgraduate studies in actuarial science or other related areas.
- viii) provide the foundation for a career in other areas of finance and risk.
- ix) provide adequate knowledge for students to sit for the early professional examinations organized by international actuarial organizations so that they can successfully join the actuarial profession after graduation.

3. Expected Learning Outcomes

Students will be able to:

- i) apply various analytic and quantitative methods to define and solve problems in insurance, finance, economics, investment, pension, financial risk management and demography.
- ii) identify the nature of insurance, finance and investment risks
- iii) demonstrate analytical skills to evaluate and measure

various kinds of risk.

- iv) formulate effective business strategies to manage risks.
- v) pass the early professional examinations organized by international actuarial organizations.
- vi) pursue postgraduate studies in actuarial science or other related fields.
- vii) discuss current actuarial issues and acquire and apply practical knowledge in some specially designed courses.

4. Admission Requirements

To be admitted into the degree of Bachelor of Science in Actuarial Science, candidates must meet the minimum university entry requirements. In addition to, candidates for the degree of Bachelor of Science in Actuarial Science must have passed Mathematics with a minimum grade of B at K.C.S.E., or an Equivalent qualification.

5. Programme Duration

To be considered for the award of the degree of Bachelor of Science in Actuarial Science, a candidate shall normally have enrolled for courses over a period of not less than four academic years.

6. Duration and Structure

- i) The courses will be offered in units, in which a course unit is defined as a three-hour lecture or six hours tutorial or nine hours practical session per week per semester.
- ii) Students will take a minimum of 14 units and maximum of 16 units in each year of study. Students wishing to take more than 16 units will require senate approval.
- iii) In the first year, students will take 12 units from the department of Statistics and Actuarial Science, and 4 units from the common University IT courses. In second year, students will take 10 core units from the department,

and a further 2 units from the elective courses offered by the department. The remaining 4 units will be taken from among the IT courses offered as University common courses.

iv) In the third and fourth years of study, students will take 8 core units, plus additional 4 units from the elective units offered by the department. The remaining 4 units will be taken from among the IT courses offered as University common courses

7. Mode of Delivery

- i) Face to face sessions involving students and lecturers with 42 contact hours
- ii) eLearning

8. Examinations

- i) The University common examinations regulations shall apply
- ii) Examinations shall be held at the end of the semester in which the courses are taught.
- iii) A written report for a project shall constitute 70% and oral examination shall constitute 30% of the total marks.

9. Key

C - CORE
R - REQUIRED
E - ELECTIVE

10. Modules Distribution

First Year

FIRST SEMESTER

MAC 107:	Introduction to Actuarial science	1C
MAC 105:	Micro Economics	1C
MAS 101:	Descriptive statistics	1C
MAS 103:	Introduction to probability theory	1C
MMA 100:	Basic mathematics	1C
MMA 111:	Introduction to Calculus	1C
MIT 101:	Basic Concepts of IT	1C
MIT 103:	Web Browsing and Communication	1C

SECOND SEMESTER

MAC 102:	Fundamentals of Actuarial Mathematics I	1C
MAC 104:	Linear models and Forecasting	1C

MAC 106:	Macro economics	1C
MAS 102:	Probability and distribution Theory	1C
MMA 112:	Analytic Geometry	1C
MMA 103:	Linear algebra	1C
MIT 104:	Descriptive Statistical; Analysis and Presentation	1C

Second Year

FIRST SEMESTER

MAC 201:	Financial Mathematics I	1C
MAC 203:	Fundamentals of Actuarial Mathematics II	1C
MAC 205:	Mathematical Modelling	1E
MAS 201:	Sample surveys	1E
MAS 203:	1 Economic statistics	1C
MMA 215:	1 Calculus	1C
MMA 201:	Linear algebra 2	1C
MMA 202:	Vector Analysis	1E
MIT 201:	Statistical Computing I	1C
MIT 203:	Collecting and organising data	1C

SECOND SEMESTER

MAC 206:	Actuarial Mathematics I	1C
MAC 210:	Investment and Assets Management I	1C
MAS 204:	Demography	1C
MAS 202:	Principles of statistical inference	1E
MMA 216:	Multivariate Calculus	1C
MMA 208:	Introduction to analysis	1C
MIT 202:	Data Management	1C
MIT 204:	Scientific Report Reading, Writing and Presentation	1C

Third Year

FIRST SEMESTER

MAC 303:	Actuarial Mathematics II	1C
MAC 305:	Pension Mathematics	1C
MAS 305:	Stochastic processes I	1C
MMA 300:	Real analysis	1C
MMA 301:	Ordinary differential equations I	1C
MIT 301:	Computer based survey techniques	1C
MIT 303:	Computers applied to Mathematics	1C

SECOND SEMESTER

MAC 300:	Financial Mathematics	1C
MAC 302:	Method of Actuarial Investigations	1C
MAC 304:	Actuarial life contingencies I	1C
MAC 306: (former 307)	Financial economics	1C
MAS 304:	Test of hypothesis	1E
MAS 314:	Research methodology	1C
MMA 303:	1 Complex analysis	1E
MIT 304:	Introduction to object oriented programming	1C
MIT 302:	Statistical Computing II	1C

THIRD SEMESTER

MAS 317:	Industrial Attachment	3C
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Fourth Year



FIRST SEMESTER

MAC 403:	Actuarial life contingencies II	1C
MAC 405:	Investment and Asset Management II	1C
MAC 407:	Principles of financial Management	1C
MAC 409:	Project in Actuarial science	1C
MAC 415:	Survival analysis	1C
MAS 403:	Non parametric methods	1E
MMA 405:	Partial differential equations	1E
MIT 401:	Bayesian Modelling	1C
MIT 403:	Writing Macros	1C

SECOND SEMESTER

MAC 402:	Bayesian Inference and Decision Theory	1C
MAC 404:	1 Computational Finance	1C
MAC 406:	Risk and Credibility Theory	1C
MAC 408:	Multivariate Methods	1E
MAS 410:	Statistical Model building	1E
MMA 402:	Measure Theory	1C
MIT 402:	Problem based statistical Analysis	1C
MIT 404:	Algorithms	1C