BS in Mathematics with Emphasis in Actuarial Science and Mathematical Finance

Degree Program Description

Actuarial science applies mathematical and statistical methods to finance and insurance, particularly to the assessment of risk. Actuarial science includes a number of interrelating disciplines, in particular the mathematics of probability and statistics. In the life insurance industry, traditional actuarial science focuses on the analysis of mortality and the production of life tables, and the application of compound interest. More recently, actuarial science has come to embrace more sophisticated mathematical modeling of finance. Ideas from financial economics are also becoming increasingly influential in actuarial thinking.

Major Program Requirements

In addition to Department Level Requirements, (https://catalog.missouri.edu/collegeofartsandscience/mathematics/department-level-requirements-mathematics/) University (https://catalog.missouri.edu/academicdegreerequirements/universityrequirements/), general education (https://catalog.missouri.edu/academicdegreerequirements/generaleducationrequirements/), and College of Arts and Science (https://catalog.missouri.edu/collegeofartsandscience/#undergraduatetext) requirements, students must also meet the following major program requirements. All major requirements in the College of Arts and Science must be completed with grades of C- or higher unless otherwise indicated.

This emphasis area will serve those who want to pursue a career in the financial and insurance industries. It will also help BS students to prepare for their first actuarial exams. In addition to course requirements, students completing this program are also required to attempt two actuarial exams (Probability and Financial Mathematics or equivalent).

Students may apply to be Math majors upon meeting the following criteria:

- Completion of ENGLSH 1000 and MATH 2300
- Both cumulative GPA and GPA in Math courses numbered 1500 and above (expect for 2100) of 2.5 or above.

All math courses required for the degree must be passed with a grade of C- or above.

Core Math Requirements for all Math degrees (24 credits)		
MATH 1500	Analytic Geometry and Calculus I	5
MATH 1700	Calculus II	5
MATH 2300	Calculus III	3
MATH 3000	Introduction to Advanced Mathematics	3
MATH 4100	Differential Equations	3
MATH 4140	Matrix Theory	3
INFOTC 1040	Introduction to Problem Solving and Programming	3
or CMP_SC 1050	Algorithm Design and Programming I	
or CMP_SC 1300	Computing with Data in Python	
Total Credits		**25**

Degree Requirements

MATH 4700	Advanced Calculus of One Real Variable I	3
MATH 4355	Quantitative Finance and Insurance I	3
MATH 4370	Interest Theory	3
MATH 4371	Models for Life Contingencies I	3
MATH 4372	Models for Life Contingencies II	3
MATH 4320/STAT 4750	Introduction to Probability Theory	3
MATH 4520/STAT 4760	Statistical Inference I	3
Additional course requirements:		
STAT 4870	Time Series Analysis	3
STAT 4510	Applied Statistical Models I	3
ECONOM 1014	Principles of Microeconomics	3
ECONOM 1015	Principles of Macroeconomics	3
Science requirement: 4 or more credits from the following:		
PHYSCS 2750	University Physics I	5
PHYSCS 2760	University Physics II	5
CHEM 1400 & CHEM 1401	College Chemistry I and College Chemistry I Laboratory	4
CHEM 1410 & CHEM 1411	College Chemistry II and College Chemistry II Laboratory	4
BIO_SC 1500	Introduction to Biological Systems with Laboratory	5
The following courses are recommended in order to prepare for additional actuarial exam or satisfy addtional VEE requirements:		
ACCTCY 2036	Accounting I	3
FINANC 3000	Corporate Finance	3
MATH 4590	Quantitative Finance and Insurance II	3
Total Credits		**65**

Semester Plan

Below is a sample plan of study, semester by semester. A student's actual plan may vary based on course choices where options are available.

First Year				
Fall	**CR**		**Spring**	**CR**
MATH 1500 (Math and Quantitative Reasoning)	5		MATH 1700	5
ECONOM 1014 (Social Science from Arts and Science)	3		ECONOM 1015 (Social Science)	3
ENGLSH 1000	3		INFOTC 1040 or CMP_SC 1300	3
Humanities from Arts and Science	3		Behavioral Science from Arts and Science	3
	14			**14**
Second Year				
Fall	**CR**		**Spring**	**CR**
MATH 2300	3		MATH 4100	3
Humanities, First Writing Intensive	3		MATH 4140	3
Missouri State Law Requirement	3		STAT 4750	3
Science Requirement (Biological or Physical Science lab)	5		Biological, Physical, or Mathematical Science	3

Second major, minor, certificate, or elective	3		Second major, minor, certificate, or elective	3	
	17			**15**	
Third Year					
Fall	**CR**		**Spring**	**CR**	
MATH 4370	3		MATH 3000W	3	
STAT 4760	3		STAT 4510	3	
ACCTCY 2036 or 2026 (Educational Experience requirement for the Society of Actuaries, Second Language Alternative)	3		ACCTCY 2037 or 2027 (Educational Experience requirement for the Society of Actuaries, Second Language Alternative)	3	
Biological, Physical, or Mathematical Science, 2000+ level	3		Humanities, 2000+ level	3	
Second major, minor, certificate, or elective	3		Second major, minor, certificate, or elective	3	
	15			**15**	
Fourth Year					
Fall	**CR**		**Spring**	**CR**	
MATH 4355	3		MATH 4372	3	
MATH 4371	3		MATH 4700	3	
STAT 4870	3		Accounting or Finance Class (Second Language Alternative)	3	
FINANC 3000 (Educational Experience requirement for the Society of Actuaries, Second Language Alternative)	3		Second major, minor, certificate, or elective	3	
Second major, minor, certificate, or elective	3		Second major, minor, certificate, or elective	3	
	15			**15**	

Total Credits: 120