

# 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

Students must complete the MU general education requirements (<http://catalog.missouri.edu/academicdegreerequirements/generaleducationrequirements/>), University graduation requirements (<http://catalog.missouri.edu/academicdegreerequirements/universityrequirements/>) and the Department Level Requirements (<http://catalog.missouri.edu/collegeofartsandscience/mathematics/department-level-requirements-mathematics/>) in addition to the degree requirements listed below.

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	
<b>Total Credits</b>		<b>25</b>

## Degree Requirements

MATH 4700	Advanced Calculus of One Real Variable I	3
MATH 4355	Mathematics of Financial Derivatives 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:

PHYSICS 2750	University Physics I	5
PHYSICS 2760	University Physics II	5
CHEM 1320	College Chemistry I	4
CHEM 1330	College Chemistry II	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 additional VEE requirements:

ACCTCY 2036	Accounting I	3
FINANC 3000	Corporate Finance	3
MATH 4590	Mathematics of Financial Derivatives 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		5 MATH 1700	5
ECONOM 1014		3 ECONOM 1015	3
ENGLSH 1000		3 INFOTC 1040	3
General Education Elective		3 General Education Elective	3
STAT 4750		3	
			<b>14</b>
			<b>17</b>

Second Year			
Fall	CR	Spring	CR
MATH 2300		3 MATH 4100	3
PHYSICS 2750		5 MATH 4140	3
General Elective		3 STAT 4750	3
Second language I		4-6 Second language II	4-6
			3
			<b>16-18</b>
			<b>15-17</b>

Third Year			
Fall	CR	Spring	CR
MATH 4355		3 MATH 3000	3
MATH 4370		3 STAT 4510	3
STAT 4760		3 MATH 4590 (Elective)	3
ACCTCY 2036 or 2026 (Elective)		3 ACCTCY 2037 or 2027 (Elective)	3

Second language III		3-4 General Education Elective	3
		<b>15-16</b>	<b>15</b>
<b>Fourth Year</b>			
<b>Fall</b>	<b>CR</b>	<b>Spring</b>	<b>CR</b>
MATH 4700		3 MATH 4372	3
MATH 4371		3 Elective	3
STAT 4870		3 Elective	3
General Education Elective		3 Elective	3
FINANC 3000 (Elective)		3 Elective	3
		<b>15</b>	<b>15</b>
<b>Total Credits: 122-127</b>			