ACTUARIAL SCIENCE, MATHEMATICS (BS)

Degree: Bachelor of Science
Major: Mathematics
Concentration: Actuarial Science
Program Code: 3438

About This Major...

The actuarial science concentration in mathematics prepares students for graduate work in actuarial science or to enter the job force. With some additional job-specific training, students entering the job market could function as actuaries in the insurance field or as applied statisticians working in areas such as risk management and marketing.

For more information on what you can do with this major, visit Career Services' What to Do with a Major? resource.

All CMU baccalaureate graduates are expected to demonstrate proficiency in specialized knowledge/applied learning, quantitative fluency, communication fluency, critical thinking, personal and social responsibility, and information literacy. In addition to these campus-wide student learning outcomes, graduates of this major will be able to:

1. Construct multi-step problem-solving strategies and communicate solutions effectively in written form. (Specialized Knowledge, Quantitative Fluency)
2. Use statistical software (including calculators) to aid in problem-solving and investigation, and understand its limitations. (Applied Learning)
3. Apply appropriate statistical procedures and justify chosen assumptions. (Applied Learning, Personal and Social Responsibility)
4. Draw statistical conclusions and evaluate the validity of others' conclusions. (Critical Thinking, Information Literacy)
5. Investigate, discuss, and respond to ethical and social challenges in a mathematical context. (Communication Fluency, Personal and Social Responsibility, Information Literacy)
6. Communicate technical analyses to non-specialists. (Communication Fluency)
7. Apply concepts of finance, economics, and risk management in statistical decision making. (Specialized Knowledge, Applied Learning)

Requirements

Each section below contains details about the requirements for this program. Select a header to expand the information/requirements for that particular section of the program's requirements.

To print or save an overview of this program's information, including the program description, learning outcomes, requirements, suggested course sequencing (if applicable), and advising and graduation information, scroll to the bottom of the left-hand navigation menu and select "Print Options." This will give you the options to either "Send Page to Printer" or "Download PDF of This Page." The "Download PDF of This Page" option prepares a much more concise presentation of all program information. The PDF is also printable and may be preferable due to its brevity.

Institutional Degree Requirements

The following institutional degree requirements apply to all CMU baccalaureate degrees. Specific programs may have different requirements that must be met in addition to institutional requirements.

- 120 semester hours minimum.
- Students must complete a minimum of 30 of the last 60 hours of credit at CMU, with at least 15 semester hours in major discipline courses numbered 300 or higher.
- 40 upper-division credits (an alternative credit limit applies to the Bachelor of Applied Science degree).
- 2.00 cumulative GPA or higher in all CMU coursework.
- A course may only be used to fulfill one requirement for each degree/certificate.
- No more than six semester hours of independent study courses can be used toward the degree.
- Non-traditional credit, such as advanced placement, credit by examination, credit for prior learning, cooperative education and internships, cannot exceed 30 semester credit hours for a baccalaureate degree. A maximum of 15 of the 30 credits may be for cooperative education, internships, and practica.
- Pre-collegiate courses (usually numbered below 100) cannot be used for graduation.
- Capstone exit assessment/projects (e.g., Major Field Achievement Test) requirements are identified under Program-Specific Degree Requirements.
- The Catalog Year determines which program sheet and degree requirements a student must fulfill in order to graduate. Visit with your advisor or academic department to determine which catalog year and program requirements you should follow.
- See "Requirements for Undergraduate Degrees and Certificates" in the catalog for a complete list of graduation requirements.

Essential Learning Requirements

(31 semester hours)

See the current catalog for a list of courses that fulfill the requirements below. If a course is an Essential Learning option and a requirement for your major, you must use it to fulfill the major requirement and make a different selection for the Essential Learning requirement.

Code	Title	Semester Credit Hours
English [1]		
ENGL 111	English Composition I-GTCO1	3
ENGL 112	English Composition II-GTCO2	3
Mathematics [1]		
MATH 151	Calculus I-GT-MA1 [2]	3
History		
Select one History course		3
Humanities		
Select one Humanities course		3
Social and Behavioral Sciences		
Select one Social and Behavioral Sciences course		3
Select one Social and Behavioral Sciences course		3
Fine Arts		

Select one Fine Arts course		3
Natural Sciences [3]		
Select one Natural Sciences course with a lab		4
Select one Natural Sciences course		3
Total Semester Credit Hours		**31**

1 Must receive a grade of "C" or better and must be complete by the time the student has 60 semester hours.

2 This is a 5 credit course. 3 credits apply to the Essential Learning requirements and 2 credits apply to electives.

3 One course must include a lab.

Other Lower Division Requirements

(6 semester hours)

Code	Title	Semester Credit Hours
Wellness Requirement		
KINE 100	Health and Wellness	1
KINA 1XX	Activity Course	1
Essential Learning Capstone [1]		
ESSL 200	Essential Speech	1
ESSL 290	Maverick Milestone	3
Total Semester Credit Hours		**6**

1 Essential Learning Capstone must be taken after completion of the Essential Learning English and Mathematics requirements, and when a student has earned between 45 and 75 hours.

Foundation Courses

(8 semester hours)

Code	Title	Semester Credit Hours
MATH 152	Calculus II	5
CISB 241	Introduction to Business Analysis	3
or STAT 241	Introduction to Business Analysis	
Total Semester Credit Hours		**8**

Program Specific Degree Requirements

(54-55 semester hours, must maintain a 2.50 cumulative GPA or higher in coursework in this area. At most one “D” may be used in completing major requirements.)

Code	Title	Semester Credit Hours
Core Courses		
MATH 150	Topics and Careers in Mathematics	1
MATH 225	Computational Linear Algebra	3
MATH 253	Calculus III	4
MATH 492	Senior Capstone	3
Select four hours from the following:		4
CSCI 110 & 110L	Beginning Programming and Beginning Programming Laboratory	
CSCI 111	CS1: Foundations of Computer Science	
CSCI 130	Introduction to Engineering Computer Science	
Required Concentration Courses		
CISB 341	Quantitative Decision Making	3
CSCI 260	Introduction to Database	3
ECON 201	Principles of Macroeconomics-GTSS1	3
ECON 415	Econometrics	3
FINA 310	Risk Management	3
STAT 301	Computational Statistics	3
STAT 312	Correlation and Regression	3
STAT 350	Mathematical Statistics I	3
STAT 351	Mathematical Statistics II	3
Concentration Electives		**12-14**
Choose four courses from the groups below. At least two courses must be from Group A and the remaining courses may be from either group.		
Group A		
STAT 313	Sampling Techniques	
STAT 425	Design and Analysis of Experiments	
STAT 430	Categorical Data Analysis	
STAT 435	Introduction to Time Series	
Group B		
MATH 240	Introduction to Advanced Mathematics	
MATH 361	Numerical Analysis	
MATH 362	Fourier Analysis	
MATH 365	Mathematical Modeling	
MATH 369	Discrete Structures I	
FINA 301	Managerial Finance [1]	
Total Semester Credit Hours		**54-56**

1 Has prerequisite of ACCT 201: Principles of Financial Accounting

General Electives

All college level courses appearing on your final transcript, not listed above, that will bring your total semester hours to 120 hours, including 40 upper-division credit hours. 19-21 semester hours; 3-7 hours of upper division may be needed.

Code	Title	Semester Credit Hours
MATH 151	Calculus I-GT-MA1	2
Select additional electives		17-19
Total Semester Credit Hours		**19-21**

Suggested Course Plan

While the sequencing below culminates in a total of 119-121 semester credit hours, students must complete a minimum of 120 semester credit hours as required for completion of this degree, including satisfactory completion of all required courses. Plan to complete requirements with varying hour options accordingly.

First Year		
Fall Semester		**Semester Credit Hours**
Select four credit hours from the following:		4
CSCI 110 & 110L	Beginning Programming and Beginning Programming Laboratory	
CSCI 111	CS1: Foundations of Computer Science	
CSCI 130	Introduction to Engineering Computer Science	
ENGL 111	English Composition I-GTCO1	3
Essential Learning - Social and Behavioral Sciences		3
MATH 151	Calculus I-GT-MA1	5
	Semester Credit Hours	**15**
Spring Semester		
ENGL 112	English Composition II-GTCO2	3
Essential Learning - History		3
Essential Learning - Social and Behavioral Sciences		3
KINA Activity		1
MATH 150	Topics and Careers in Mathematics	1
MATH 152	Calculus II	5
	Semester Credit Hours	**16**
Second Year		
Fall Semester		
CISB 241 or STAT 241	Introduction to Business Analysis or Introduction to Business Analysis	3
ECON 201	Principles of Macroeconomics-GTSS1	3
Essential Learning - Fine Arts		3
Essential Learning - Humanities		3
MATH 253	Calculus III	4
	Semester Credit Hours	**16**
Spring Semester		
CSCI 260	Introduction to Database	3
ESSL 200	Essential Speech	1
ESSL 290	Maverick Milestone	3
Essential Learning - Natural Science with Lab		4
KINE 100	Health and Wellness	1
MATH 225	Computational Linear Algebra	3
	Semester Credit Hours	**15**
Third Year		
Fall Semester		
CISB 341	Quantitative Decision Making	3
FINA 310	Risk Management	3
General Elective		3
STAT 301	Computational Statistics	3
STAT 350	Mathematical Statistics I	3
	Semester Credit Hours	**15**
Spring Semester		
Concentration Elective from Group A or B		3
Essential Learning - Natural Science		3
General Elective		3
STAT 312	Correlation and Regression	3
STAT 351	Mathematical Statistics II	3
	Semester Credit Hours	**15**
Fourth Year		
Fall Semester		
Concentration Electives from Group A or B		6-8
General Electives		6
MATH 492	Senior Capstone	3
	Semester Credit Hours	**15-17**
Spring Semester		
Concentration Elective from Group A or B		3
ECON 415	Econometrics	3
General Electives		5-7
	Semester Credit Hours	**11-13**
	Total Semester Credit Hours	**118-122**

Advising and Graduation

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