

# FINANCE, BACHELOR OF SCIENCE (B.S.) WITH A CONCENTRATION IN ACTUARIAL SCIENCE

The actuarial science concentration provides excellent preparation for the basic professional examinations and continued study in actuarial science. Students who complete this concentration also may find employment in areas such as quantitative applications in corporate and public financial policy, actuarial modeling and forecasting, reserves computation and rate making, and computer and information systems in the financial services and risk management industries.

## Learning goals

- Acquire a comprehensive understanding of actuarial science and risk management principles, bridging theoretical concepts with real-world industry applications.
- Develop the quantitative and analytical skills necessary to extract, analyze, and interpret complex datasets for informed decision-making.
- Advance professional skills, including critical thinking, problem-solving, and effective communication, to approach complex business challenges with analytical rigor and strategic creativity.

## Student learning outcomes

Upon completing this program:

- **Actuarial Principles Application:** Accurately apply actuarial science principles and core knowledge. A key outcome is ensuring students are prepared with the content necessary to successfully pass the first two professional examinations administered by the CAS and SOA, providing a direct pathway to a career as an actuary.
- **Quantitative Insight:** Proficiently use quantitative and analytical techniques to generate data-driven insights for assessing and managing risks and opportunities in actuarial contexts.
- **Professional Agility & Curiosity:** Demonstrate learning agility by developing a curious outlook toward existing models and new information, quickly absorbing new knowledge and actively seeking challenges in the evolving financial and technological landscape.

## Special requirements

The School of Business has special academic policies (<http://bulletin.vcu.edu/undergraduate/business/undergraduate-information/academic-policies/>), including policies on transfer credits, that apply to all undergraduate degrees.

## School of Business and B.S. in Finance progression policies

Students enrolled in undergraduate programs of the School of Business engage in a demanding curriculum designed to set them up for success in the world of business. In order to successfully maintain progress

towards graduation, students are required to meet the following criteria in order to remain in their majors:

- Students are required to pass major and ancillary requirements within two attempts. If a student withdraws from a course, it will count as an attempt.
- Upon the third attempt at a course, students will be placed on business probation and must pass the course successfully in that third attempt.
- Students must maintain a minimum 2.0 major GPA.
- If a student's major GPA drops below 2.0, they will be placed on business probation and allowed one semester to raise their major GPA to 2.0.

Upon notification of being placed on business probation, students will receive a registration hold, and must meet with their business adviser prior to the add/drop deadline of the pursuant semester in order to create an action plan to either pass the repeated course successfully, or increase their major GPA.

Students who do not meet the performance expectations of business probation in that same semester will be required to change their major prior to the start of the next semester.

Students may appeal the change of major via the associate dean of the School of Business. Students must initiate the appeal with their assigned academic adviser. The associate dean may, at their discretion, extend the time period needed to meet the requirements, generally by only one semester. A student who wishes to appeal must submit his or her appeal at least one week prior to the start of the next semester in which they register for classes.

## Degree requirements for Finance, Bachelor of Science (B.S.) with a concentration in actuarial science

Course	Title	Hours
<b>General education (<a href="https://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/">https://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/</a>)</b>		
Select 30 credits of general education courses in consultation with an adviser.		30
<b>Major requirements</b>		
• Major core requirements		
FIRE 312	Financial Modeling	3
FIRE 317	Investments	3
• Concentration requirements		
FIRE 319	Financial Mathematics	3
FIRE 320	Actuarial Probability Concepts	3
FIRE 321	Intermediate Financial Management	3
Approved actuarial science electives		
Select courses from the list below.		15
• Ancillary core courses		
ACCT 203 & ACCT 204	Introduction to Financial Reporting and Introduction to Managerial Accounting	6
BUSN 301	Career and Professional Development	1

BUSN 323	Legal Environment of Business	3	FIRE 340	Introduction to Financial Analytics	3
BUSN 325	Business Communications	3	FIRE 540	Financial Analytics	3
BUSN 499	Business Knowledge Exam	0	HSEP 302	Emergency Planning and Response	3
ECON 210	Principles of Microeconomics (satisfies general education BOK for social/behavioral sciences and/or AOI for global perspectives)	3	HSEP 310	Hazard Mitigation and Risk Assessment	3
ECON 211	Principles of Macroeconomics	3	HSEP 320	Intelligence, Espionage and Covert Action	3
FIRE 311	Financial Management	3	HSEP 347	Intelligence Analysis	3
INFO 360	Business Information Systems	3	INFO 202	Introduction to Information Systems Development Technologies	3
MGMT 303	Creativity and Ideation	3	INFO 320	Artificial Intelligence for Business Intelligence	3
MGMT 310	Managing People in Organizations	3	INFO 361	Systems Analysis and Design	3
MGMT 434	Strategic Management	3	INFO 364	Database Systems	3
MKTG 301	Marketing Principles	3	INFO 450	Programming for Business Analytics	3
SCMA 301	Business Statistics I	3	INFO 452	AI Services for Business	3
SCMA 320	Production/Operations Management	3	MATH 201	Calculus with Analytic Geometry II	4
• Additional ancillary requirements					
BUSN 201	Foundations of Business <sup>1</sup>	3	MATH 211	Mathematical Structures	3
or BUSN 205	Introduction to the World of Business		MATH 307	Multivariate Calculus	4
BUSN 212	Business Problem Solving and Analysis (either satisfies general education quantitative foundations)	4	MATH 310	Linear Algebra	3
or MATH 200	Calculus with Analytic Geometry I		SCMA 302	Business Statistics II	3
<b>Open electives</b>					
Select any course. <sup>2</sup>					
<b>Total Hours</b>					<b>120</b>

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BUSN 205 satisfies general education AOI for global perspectives.

2

Students may choose electives to reach the minimum total of 120 credits.

**The minimum number of credit hours required for this degree is 120.**

### Approved actuarial science electives

Course	Title	Hours
CMSC 210	Computers and Programming	3
CMSC 225	Essentials of Artificial Intelligence	3
CMSC 235	Computing and Data Ethics	3
CMSC 255	Object-oriented Programming	4
CMSC 256	Introduction to Data Structures	4
CMSC 302	Introduction to Discrete Structures	3
CMSC 401	Algorithm Analysis with Advanced Data Structures	3
CMSC 413	Introduction to Cybersecurity	3
CMSC 414	Computer and Network Security	3
or CMSC 415	Introduction to Cryptography	
CMSC 435	Introduction to Data Science	3
CMSC 436	Artificial Intelligence	3
CMSC 438	Machine Learning	3
CMSC 535	Introduction to Data Science	3
FIRE 309	Risk Management and Insurance	3

FIRE 340	Introduction to Financial Analytics	3
FIRE 540	Financial Analytics	3
HSEP 302	Emergency Planning and Response	3
HSEP 310	Hazard Mitigation and Risk Assessment	3
HSEP 320	Intelligence, Espionage and Covert Action	3
HSEP 347	Intelligence Analysis	3
INFO 202	Introduction to Information Systems Development Technologies	3
INFO 320	Artificial Intelligence for Business Intelligence	3
INFO 361	Systems Analysis and Design	3
INFO 364	Database Systems	3
INFO 450	Programming for Business Analytics	3
INFO 452	AI Services for Business	3
MATH 201	Calculus with Analytic Geometry II	4
MATH 211	Mathematical Structures	3
MATH 307	Multivariate Calculus	4
MATH 310	Linear Algebra	3
SCMA 302	Business Statistics II	3
SCMA 303	Business Analytics	3
SCMA 440	Data Mining and Forecasting	3
STAT 305	Intermediate Statistics	3
STAT 309	Introduction to Probability Theory	3
STAT 310	Introduction to Statistical Inference	3
STAT 321	Introduction to Statistical Computing for Data Science	3
STAT 354	Data Science for Business	3
STAT 355	Data Science for AI	3
STAT 421	Statistical Computing for Machine Learning and Artificial Intelligence	3
STAT 447	Introduction to Statistical Data Science	3

What follows is a sample plan that meets the prescribed requirements within a four-year course of study at VCU. Please contact your adviser before beginning course work toward a degree.

### Recommended course sequence/plan of study

#### Freshman year

Fall semester	Hours	
BUSN 201	Foundations of Business <sup>1</sup>	3
or BUSN 205	or Introduction to the World of Business <sup>1</sup>	
UNIV 111	Introduction to Focused Inquiry: Investigation and Communication (satisfies general education UNIV foundations)	3
Play course video for Introduction to Focused Inquiry: Investigation and Communication		

UNIV 191	Student Success Special Topics	1
or	or Introduction to the University	
UNIV 101	or Education and Career Planning	
or		
UNIV 103		
General education courses		6
Open elective (prerequisite to BUSN 212 suggested)		3
<b>Term Hours:</b>		<b>16</b>
<b>Spring semester</b>		
ACCT 203	Introduction to Financial Reporting	3
BUSN 212	Business Problem Solving and Analysis	4
or	or Calculus with Analytic Geometry I	
MATH 200		
ECON 210	Principles of Microeconomics (satisfies general education BOK for social/behavioral sciences and/or AOI for global perspectives)	3
UNIV 200	Advanced Focused Inquiry: Literacies, Research and Communication (satisfies general education UNIV foundations)	3
General education course		3
<b>Term Hours:</b>		<b>16</b>
<b>Sophomore year</b>		
<b>Fall semester</b>		
ACCT 204	Introduction to Managerial Accounting	3
ECON 211	Principles of Macroeconomics	3
MKTG 301	Marketing Principles	3
SCMA 301	Business Statistics I	3
General education course		3
<b>Term Hours:</b>		<b>15</b>
<b>Spring semester</b>		
BUSN 301	Career and Professional Development	1
BUSN 325	Business Communications	3
FIRE 311	Financial Management	3
MGMT 303	Creativity and Ideation	3
MGMT 310	Managing People in Organizations	3
General education course		3
<b>Term Hours:</b>		<b>16</b>
<b>Junior year</b>		
<b>Fall semester</b>		
FIRE 312	Financial Modeling	3
FIRE 319	Financial Mathematics	3
INFO 360	Business Information Systems	3
SCMA 320	Production/Operations Management	3
Approved actuarial science elective		3
<b>Term Hours:</b>		<b>15</b>
<b>Spring semester</b>		
BUSN 323	Legal Environment of Business	3
FIRE 317	Investments	3
FIRE 320	Actuarial Probability Concepts	3
Open elective		3
<b>Term Hours:</b>		<b>12</b>
<b>Senior year</b>		
<b>Fall semester</b>		

FIRE 321	Intermediate Financial Management	3
Approved actuarial science electives		6
General education course		3
Open elective		3
<b>Term Hours:</b>		<b>15</b>
<b>Spring semester</b>		
BUSN 499	Business Knowledge Exam	0
MGMT 434	Strategic Management	3
Approved actuarial science electives		6
Open electives		6
<b>Term Hours:</b>		<b>15</b>
<b>Total Hours:</b>		<b>120</b>

1

BUSN 205 satisfies general education AOI for global perspectives.

**The minimum number of credit hours required for this degree is 120.**