

FINANCIAL TECHNOLOGY, BACHELOR OF SCIENCE (B.S.) WITH A CONCENTRATION IN ACTUARIAL SCIENCE

The Bachelor of Science in Financial Technology offers concentrations in actuarial science and financial engineering. The program provides quantitatively oriented students the opportunity to apply mathematical, statistical and programming tools to the financial, risk management and actuarial disciplines. Designed to meet the growing need for quantitative modeling and analysis in finance, risk management and actuarial science, the program is technical and interdisciplinary in nature. The curriculum emphasizes courses in finance, statistics and mathematics with supporting courses in related areas.

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

- To support career advancement over time by giving students the academic foundation in finance and actuarial sciences needed for continued professional development
- To help students develop the professional skills that will be needed by the businesses and organizations that hire graduates
- To help students develop ethical awareness so that they are able to deal with an ethical dilemma in the workplace

Student learning outcomes

Upon completing this program, students will know and know how to do the following.

- Students will be able to identify and use relevant data to calculate appropriate quantitative measures that help in making informed actuarial calculations.
- Students will be able to describe and expound on competing propositions in a structured, organized and deliberate manner with comparisons, anecdotal evidence and descriptive analysis.
- Students will be able to express the analytic, quantitative and ethical dimensions of a business problem and proposed solutions in a clear, well-organized manner that is free of bias or distortions.

Special requirements

Students in the actuarial science concentration must attain a minimum grade of C in MATH 200, MATH 307, STAT 309, STAT 310, FIRE 319. A student receiving a grade below C may repeat the course one time to raise the grade to the required level. In addition, a minimum GPA of 2.5 must be maintained. Students who fall below a GPA of 2.5 will be placed on program probation and will be given one semester to return to the minimum GPA of 2.5. Students who do not return to the required

minimum cumulative GPA of 2.5 after two semesters will be dismissed from the financial technology major. Students who do not satisfactorily attain the minimum grade of C in one course after two attempts will be dismissed from the financial technology major. In concert with the academic adviser of the department, an appeal may be submitted to the chair of the department. A student must have a minimum GPA of 2.5 to graduate from the program. At least 30 hours of the required business courses for the Bachelor of Science must be taken at VCU.

Students admitted into this program must place into MATH 200 to continue in the program. No more than three credits in physical education courses may be applied to the degree. Many courses are offered irregularly; please work with an adviser for optimal course sequencing.

Credit for SPCH 121 or SPCH 321 will substitute for BUSN 225, and no more than three credits of these courses may be applied toward a business degree. Students who earned a minimum grade of B in either ECON 203 or ECON 205 at VCU may substitute that credit for ECON 210.

The pass/fail grading policy may not be used for many course requirements. Students should check with their academic adviser before taking the pass/fail grading option.

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. The pass/fail grading policy may not be used for courses that can satisfy major degree requirements.

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

| Course | Title | Hours |
|--|---|-------|
| General education (https://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/) | | |
| Select 30 credits of general education courses in consultation with an adviser. | | 30 |
| Major requirements | | |
| • Major core requirements | | |
| CMSC 210 | Computers and Programming | 3 |
| FIRE 309 | Risk Management and Insurance | 3 |
| FIRE 312 | Financial Modeling | 3 |
| FIRE 317 | Investments | 3 |
| FIRE 321 | Intermediate Financial Management | 3 |
| FIRE 417 | Security Analysis and Portfolio Management | 3 |
| FIRE 451 | Options, Futures and Swaps | 3 |
| FIRE 479 | Enterprise Risk Management | 3 |
| INFO 320 | Artificial Intelligence for Business Intelligence | 3 |
| MATH 201 | Calculus with Analytic Geometry II | 4 |
| MATH 211 | Mathematical Structures | 3 |
| MATH 307 | Multivariate Calculus | 4 |
| STAT 309 | Introduction to Probability Theory | 3 |
| • Concentration requirements | | |
| FIRE 319 | Financial Mathematics | 3 |
| FIRE 320 | Actuarial Probability Concepts | 3 |

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|---------------------------------------|--|----|---|--|---|
| STAT 310 | Introduction to Statistical Inference | 3 | ECON 211 | Principles of Macroeconomics | 3 |
| STAT 212 | Concepts of Statistics | 3 | FIRE 311 | Financial Management | 3 |
| Concentration electives (choose four) | | 12 | • Additional ancillary requirements | | |
| ACCT 303 | Intermediate Accounting I | | MATH 200 | Calculus with Analytic Geometry I (satisfies general education quantitative foundations) | 4 |
| ACCT 304 | Intermediate Accounting II | | Open electives | | |
| BNFO 201 | Computing Skills and Concepts for Bioinformatics | | Select any course. ¹ | | |
| BUSN 400 & BUSN 401 | Principles of Consulting and International Consulting Practicum (must get credit for both courses to count toward degree completion) | | Total Hours 123 | | |
| BUSN 301 | Career and Professional Development | | 1 | | |
| BUSN 323 | Legal Environment of Business | | Students may choose electives to reach the minimum total of 123 credits. | | |
| CMSC 330 | Data Science Skills | | The minimum number of credit hours required for this degree is 123. | | |
| ECON 307 | Money and Banking | | 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. | | |
| ECON 403 | Introduction to Mathematical Economics | | Freshman year | | |
| FIRE 305 | Principles of Real Estate | | Fall semester | | |
| FIRE 316 | International Financial Management | | Hours | | |
| FIRE 429 | Property and Liability Insurance | | ECON 210 | Principles of Microeconomics (satisfies general education BOK for social/behavioral sciences and/or AOI for global perspectives) | 3 |
| FIRE 439 | Life and Health Insurance | | MATH 200 | Calculus with Analytic Geometry I (satisfies general education quantitative foundations) | 4 |
| FIRE 449 | Employee Benefit Planning | | UNIV 111 | Introduction to Focused Inquiry: Play course | 3 |
| FIRE 459 | Insurance Law | | Investigation and Communication (satisfies general education UNIV foundations) | | |
| FIRE 461 | Cases in Financial Management | | Introduction to Focused Inquiry: Investigation and Communication | | |
| FIRE 491 | Topics in Finance, Insurance and Real Estate | | General education course | | 3 |
| FIRE 492 | Independent Study in Finance, Insurance and Real Estate | | General education course | | 3 |
| FIRE 493 | Internship in Finance, Insurance and Real Estate | | Term Hours: 16 | | |
| FIRE 496 | Practicum in Portfolio Management | | Spring semester | | |
| FIRE 540 | Financial Analytics | | ECON 211 | Principles of Macroeconomics | 3 |
| INFO 300 | Information Technology Infrastructure | | MATH 201 | Calculus with Analytic Geometry II | 4 |
| INFO 350 | Intermediate Programming | | STAT 212 | Concepts of Statistics | 3 |
| MATH 310 | Linear Algebra | | UNIV 112 | Focused Inquiry II (satisfies general education UNIV foundations) | 3 |
| MGMT 310 | Managing People in Organizations | | Play course | | |
| MGMT 434 | Strategic Management | | video for | | |
| MKTG 301 | Marketing Principles | | Focused Inquiry II | | |
| MKTG 350 | Customer and Marketing Analytics | | General education course | | 3 |
| SCMA 320 | Production/Operations Management | | Term Hours: 16 | | |
| SCMA 339 | Quantitative Solutions for Supply Chain Management | | Sophomore year | | |
| STAT 321 | Introduction to Statistical Computing for Data Science | | Fall semester | | |
| STAT 403 | Introduction to Stochastic Processes | | ACCT 203 | Introduction to Accounting I | 3 |
| Ancillary requirements | | | FIRE 309 | Risk Management and Insurance | 3 |
| • Ancillary core courses | | | FIRE 319 | Financial Mathematics | 3 |
| ACCT 203 & ACCT 204 | Introduction to Accounting I and Introduction to Accounting II | 6 | | | |
| BUSN 225 | Winning Presentations | 3 | | | |
| ECON 210 | Principles of Microeconomics (satisfies general education BOK for social/behavioral sciences and/or AOI for global perspectives) | 3 | | | |

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| UNIV 200 | Advanced Focused Inquiry: Literacies, Research and Communication (satisfies general education UNIV foundations) | 3 |
| General education course | | 3 |
| Term Hours: | | 15 |
| Spring semester | | |
| ACCT 204 | Introduction to Accounting II | 3 |
| BUSN 225 | Winning Presentations | 3 |
| FIRE 320 | Actuarial Probability Concepts | 3 |
| MATH 211 | Mathematical Structures | 3 |
| General education course | | 3 |
| Term Hours: | | 15 |
| Junior year | | |
| Fall semester | | |
| FIRE 311 | Financial Management | 3 |
| INFO 320 | Artificial Intelligence for Business Intelligence | 3 |
| STAT 309 | Introduction to Probability Theory | 3 |
| MATH 307 | Multivariate Calculus | 4 |
| Concentration elective | | 3 |
| Term Hours: | | 16 |
| Spring semester | | |
| CMSC 210 | Computers and Programming | 3 |
| FIRE 312 | Financial Modeling | 3 |
| FIRE 317 | Investments | 3 |
| STAT 310 | Introduction to Statistical Inference | 3 |
| Open elective | | 3 |
| Term Hours: | | 15 |
| Senior year | | |
| Fall semester | | |
| FIRE 321 | Intermediate Financial Management | 3 |
| FIRE 451 | Options, Futures and Swaps | 3 |
| FIRE 479 | Enterprise Risk Management | 3 |
| Concentration elective | | 3 |
| Open elective | | 3 |
| Term Hours: | | 15 |
| Spring semester | | |
| FIRE 417 | Security Analysis and Portfolio Management | 3 |
| Concentration electives | | 6 |
| Open electives | | 6 |
| Term Hours: | | 15 |
| Total Hours: | | 123 |

The minimum number of credit hours required for this degree is 123.