Quantitative Finance Certificate

November 2024

The Quantitative Finance track is one of the two curricular options of the Actuarial Studies and Quantitative Finance Certificate Program. Successful completion results in the award of the Quantitative Finance Certificate by the Leeds School of Business and the College of Arts & Sciences. The certificate is independent of any major course of study and is open to all students. However, the curriculum fits best with the curricula for majors in Applied Mathematics, Business and Economics due to overlapping requirements with degrees in these areas.

# Purpose

The Quantitative Finance Track is designed to provide candidates with a very strong analytical grounding for application in the business environment, particularly in the finance function. Recruiters have consistently listed strong analytical skills highly among desired characteristics in job candidates, even more so when recruiting to fill highly competitive complex financial analysis positions. In addition, the program provides a solid base for success in graduate studies. Program requirements are extensive and challenging. Most students will begin study during the freshman year and continue throughout their undergraduate career.

# Interdisciplinary Curriculum

Quantitative Finance is jointly sponsored by the Leeds School of Business and the College of Arts & Sciences and requires coursework from the Finance and Accounting Divisions in the Leeds School of Business and from the Mathematics, Economics and Applied Mathematics Departments in the College of Arts & Sciences.

# Potential Career Impact

Quantitative Finance is designed to provide a competitive preparatory advantage for students interested in successful careers in a variety of fields. Examples of the career areas for which the preparation provided by Quantitative Finance is particularly well suited include:

* Financial consulting
* Pension consulting
* Investment management research
* Portfolio management
* Corporate treasury functions
* Institutional securities sales & trading
* Institutional financial marketing
* Investment banking

Due to the scarcity of competitive programs nationally which combine rigorous training in quantitative methods and extensive finance training, it is expected that successful candidates will encounter strong job demand in areas of direct interest. In addition, the Quantitative Finance curriculum provides a very strong foundation for students interested in additional academic training in the future.

# Rigorous Requirements

Quantitative Finance requirements constitute a very high level of academic rigor. Both initial and on-going academic performance requirements are greater than for any major area of study.

At a minimum, successful candidates are required to complete:

21-24 credit hours of mathematical/statistical coursework

15 credit hours of economics coursework

21 hours of finance/accounting coursework

3-4 credit hours of computer programming coursework

Most successful candidates will complete mathematics/statistics and accounting coursework in excess of the minimum required. The program is designed for students with strong academic credentials and a genuine interest in analytical work.

# The GPA Requirement

The mathematics/statistics requirement can be met either by achieving a GPA of 2.70 in the three calculus courses or by achieving a GPA of 3.0 in the six mathematics/statistics courses.

Candidates must achieve a GPA of 3.0 for all courses applied to the certificate

# Faculty Mentoring

Candidates in good standing the Quantitative Finance program are advised by a faculty member in their major area of study in addition to any advising services provided by the school. The advising faculty members communicate regularly with faculty in other involved departments to coordinate optimal schedules for students of any major. The following faculty members are members of the Certificate Committee and are available to advise students.

* Dr. Daniel Brown (Business) [daniel.brown@colorado.edu](mailto:daniel.brown@colorado.edu)
* Dr. Anne Dougherty (Applied Mathematics) [anne.dougherty@colorado.edu](mailto:anne.dougherty@colorado.edu)
* Dr. David Grant (Mathematics) [grant@colorado.edu](mailto:grant@colorado.edu)
* Dr. Nick Flores (Economics) [nicholas.flores@colorado.edu](mailto:nicholas.flores@colorado.edu)

# Specific Curricular Requirements

Listed below is the minimum coursework required to obtain the Quantitative Finance Certificate. Most students go beyond the minimum requirements. Students can apply to the program after completing Calculus 1. Students may withdraw at any time by contacting the faculty mentor in the program.

# Math

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| --- | --- | --- |
| Calculus 1 | APPM 1350\*/MATH 1300\* | 4/5 credits |
| Calculus 2 | APPM 1360/ MATH 2300 | 4/5 credits |
| Calculus 3 | APPM 2350/ MATH 2400 | 4/5 credits |
| Linear Algebra | APPM 3310/ MATH 2130/MATH 2135 | 3 credits |
| Probability and Statistics\* | Track 1: MATH 4510 or APPM 3570 then MATH 4520 or STAT 4520  Track 2: STAT 4000 and STAT 4010 | 6 credits |

# Economics

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| --- | --- | --- |
| Intro. to Microeconomics | ECON 2010 | 4 credits |
| Intro to Macroeconomics | ECON 2020 | 4 credits |
| Intermed. Microeconomics | ECON 3070 | 4 credits |
| Intro. to Econometrics | ECON 4818 4848 or 4858 | 3 credits |

# Business

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| Principals of Accounting | BCOR 2203 or BUSM 2020 | 1.5 credits |
| Principals of Financial Mgmt. | BCOR 2204 or BUSM 2021 | 1.5 credits |
| Corporate Finance | FNCE 3010 | 3 credits |
| Mathematical Finance or Financial Markets and Institutions | FNCE 4820 or APPM 4720 or FNCE 4070 | 3 credits |
| Investments and Portfolio Theory | FNCE 3030 | 3 credits |
| Derivative Securities | FNCE 4040 | 3 credits |
| Corporate Financial Reporting I or Data Structures | ACCT 3220 or CSCI 2270 | 3 credits |
| One Finance, Accounting or Computer Science Elective | Must be at 4000 level for FNCE/ACCT or 3000 or 4000 level for CSCI | 3 credits |

# Computer Programing\*\*

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| --- | --- | --- |
| One computer programming course | CSCI 1300, APPM 1650 or another approved CS course. | 3/4 credits |

\* Track 1 for Probability and Statistics will provide a more theoretical background and is recommended if you are thinking about a graduate program in financial engineering or finance. Track 2 is more applied.

\*\* Students with interest in computer science can substitute additional CS courses for two business classes. See business requirements

# Revision of Your First Semester Schedule

First-year business students planning to pursue the Quantitative Finance Certificate should consult their academic advisors to revise their fall semester schedule.

When changing courses, it is wise to (1) chose the SWAP option to swap the old course with the new or (2) ADD THE NEW COURSE FIRST AND THEN DROP THE OLD COURSE. Please note that if you drop your original course first, you are at risk of not being able to add it back.

# Business Majors

If you are a business major, you are following a different math sequence than required by the business school. If you follow this sequence but subsequently drop the QF certificate, you must discuss with your advisor the implications for graduation. You are required to fulfill the mathematics requirements for your degree.

# Contact

Students interested in the program should contact Daniel Brown as soon as possible. [*daniel.brown@colorado.edu*](mailto:daniel.brown@colorado.edu)