ACTUARIAL STUDIES AND QUANTITATIVE FINANCE - CERTIFICATE

Program Tracks

The actuarial studies and quantitative finance certificate program offers two tracks:

- actuarial studies track
- quantitative finance track

Actuarial Studies Track

The actuarial studies track, offered by the College of Arts and Sciences, is designed to help students obtain the expertise in mathematics, economics and finance necessary to become actuaries—the mathematical planners of the insurance and pension industries.

Students in the program can be of any major or college, or can be classified as nondegree. The entrance requirement is three semesters of calculus completed with grades of B+ or better. There are a number of courses in mathematics, economics and business required to earn the certificate. The certificate is awarded by the dean of the College of Arts and Sciences.

Besides taking courses, students are encouraged to take the professional exams offered by the various actuarial societies. The entrance requirements can be waived for students who pass the first actuarial examination.

Interested students should contact one of the co-directors: David Grant at 303-492-7208 or Anne Dougherty at 303-492-4011, who will also provide advice on actuarial studies to students who are not in the program. For more information, visit the Actuarial Studies and Quantitative Finance Certificate Program (http://www.colorado.edu/asqf/) webpage.

Quantitative Finance Track

The quantitative finance track, offered jointly by the College of Arts and Sciences and the Leeds School of Business, was initiated in the fall of 2004 and is designed to prepare students for financial and economics analyst positions that require outstanding quantitative skills. Often employers hire graduate students for such positions due to a shortage of undergraduates with the required combination of skills and training. This program is designed to meet this need.

The required curriculum is extensive and rigorous. Potential participants are encouraged to begin work early in their studies, preferably during the first year. Coursework draws from the Departments of Mathematics, Applied Mathematics and Economics; and the Leeds School of Business. Qualified students enrolled in any college are invited to participate.

For admittance to the program, a student must earn a GPA of 2.87 or higher in Calculus I through III. However, students may be provisionally admitted after completion of Calculus I (MATH 1300 or APPM 1350) with a grade of B or better or through advanced placement. Additional GPA requirements must be met to earn the certificate. Participants may be given preference when enrolling in certain courses in the Leeds School of Business.

Interested students should contact Daniel Brown, Leeds School of Business, at daniel.brown@colorado.edu. For more information, visit the Actuarial Studies and Quantitative Finance Certificate Program (http://www.colorado.edu/asqf/) webpage.

Requirements

Overview

Curricula are rigorous and multi-disciplinary, with required coursework drawing from the Mathematics, Applied Mathematics and Economics Departments, as well as the Finance Division of the Leeds School of Business. The confluence of such widely varying material is one of the unique features of the program. Successful completion of the program requirements is a significant accomplishment.

Actuarial Studies Track

The courses listed below are the minimum required in order to complete the actuarial studies track of the program. You must achieve a grade of C- or better in all courses.

Required Courses and Credits

Code	Title	Credit Hours
Required Mathematics Courses		
MATH 1300	Calculus 1	4-5
or APPM 1350	Calculus 1 for Engineers	
MATH 2300	Calculus 2	4-5
or APPM 1360	Calculus 2 for Engineers	
MATH 2400	Calculus 3	4-5
or APPM 2350	Calculus 3 for Engineers	
or APPM 2340	Calculus 3 for Statistics and Data Science	
MATH 2130	Introduction to Linear Algebra for Non-Mathematics Majors	3
or APPM 3310	Matrix Methods and Applications	
MATH 4510	Introduction to Probability Theory	3
or APPM 3570	Applied Probability	
MATH/STAT 4520	Introduction to Mathematical Statistics	3
MATH/STAT 4540	Introduction to Time Series	3
Required Economics Course		
ECON 3070	Intermediate Microeconomic Theory	4
ECON 3080	Intermediate Macroeconomic Theory	3
ECON 4070	Topics in Microeconomics	3
Required Finance/Accounting Courses		
BCOR 2203 & BCOR 2204	Principles of Accounting I and Principles of Financial Management	3
FNCE 3010	Corporate Finance	3
Additional Recommended Courses		
APPM 4560	Markov Processes, Queues, and Monte Carlo Simulations	
ECON 3818	Introduction to Statistics with Computer Applications	
ECON 4818	Introduction to Econometrics	
FNCE 3030	Investment and Portfolio Management	
FNCE 4040	Derivative Securities	
MATH/APPM 4120	Introduction to Operations Research	

MATH/APPM 4650	Intermediate Numerical Analysis 1	
STAT 4610	Statistical Learning	
Total Credit Hours		**40-43**

Quantitative Finance Track

Program requirements are extensive and challenging. Students must meet two separate GPA requirements:

1. The overall GPA for all courses applied to certificate requirements must be at least 3.00.
2. Students must meet a requirement specifically for mathematics and statistics courses applied to certificate requirements. This requirement can be met one of two ways, either by achieving a GPA of 2.7 or greater in calculus courses or a GPA of 3.00 or greater in the six mathematics and statistics courses required for the certificate.

Most students will begin study during their freshman year and continue throughout their undergraduate career. The number of credit hours taken may vary according to the specific courses completed.

The courses listed below are the minimum required in order to complete the quantitative finance track of our program. Please note that students must pass Calculus I, II, and III with a B grade or better in order to be admitted into the program. Students are encouraged to go beyond the minimum requirements, and most students do.

Required Courses and Credits

Code	Title	Credit Hours
Required Calculus Courses		
MATH 1300	Calculus 1	4-5
or APPM 1350	Calculus 1 for Engineers	
MATH 2300	Calculus 2	4-5
or APPM 1360	Calculus 2 for Engineers	
MATH 2400	Calculus 3	4-5
or APPM 2350	Calculus 3 for Engineers	
or APPM 2340	Calculus 3 for Statistics and Data Science	
Linear Algebra		
MATH 2130	Introduction to Linear Algebra for Non-Mathematics Majors	3
or MATH 2135	Introduction to Linear Algebra for Mathematics Majors	
or APPM 3310	Matrix Methods and Applications	
Probability		
MATH 4510	Introduction to Probability Theory	3
or APPM 3570	Applied Probability	
or STAT 4000	Statistical Methods and Application I	
Statistics		
MATH/STAT 4520	Introduction to Mathematical Statistics	3
or STAT 4010	Statistical Methods and Applications II	
Economics Course Requirements		
ECON 2010	Principles of Microeconomics	4
ECON 2020	Principles of Macroeconomics	4
ECON 3070	Intermediate Microeconomic Theory	4
ECON 4818	Introduction to Econometrics	3
or ECON 4848	Applied Econometrics	
or ECON 4858	Financial Econometrics	
Principals		
BCOR 2203	Principles of Accounting I	1.5
or BUSM 2020	Principles of Accounting	
BCOR 2204	Principles of Financial Management	1.5
or BUSM 2021	Principles of Finance	
Finance Requirements		
FNCE 3010	Corporate Finance	3
FNCE 3030	Investment and Portfolio Management	3
FNCE 4040	Derivative Securities	3
Accounting/Computer Science		
ACCT 3220	Corporate Financial Reporting 1	3
or CSCI 2270	Computer Science 2: Data Structures	
Mathematical Finance or Finance & Institutions		
FNCE 4070	Financial Markets and Institutions Topic for FNCE 4820/APPM 4720 must be Mathematical Finance	3
or FNCE 4820	Topics in Finance	
or APPM 4720	Open Topics in Applied Mathematics	
Elective		
FNCE 4000 level, ACCT 4000 level, or CSCI 3000/4000 level		3
Computer Science		**3-4**
BAIM 3220	Introduction to Python Programming	
or CSCI 1300	Computer Science 1: Starting Computing	
or APPM 1650	Python for Math and Data Science Applications	
Total Credit Hours		**60-64**

For a complete list of requirements and further information regarding the quantitative finance track and the related actuarial studies track, see the Actuarial Studies and Quantitative Finance Certificate Program (https://www.colorado.edu/program/asqf/) webpage. Interested students should contact Daniel Brown, daniel.brown@colorado.edu (Daniel.Brown@colorado.edu), Leeds School of Business.