DEPARTMENT OF HIGHER EDUCATION & WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:
10/19/2023

Institution
Fontbonne University

Site Information

Implementation Date:
8/15/2022 12:00:00 AM

Added Site(s):

Selected Site(s):

Fontbonne University, 6800 Wydown Boulevard, St. Louis, MO, 63105-3098

CIP Information

CIP Code:
521304

CIP Description:
A program that focuses on the mathematical and statistical analysis of risk, and their applications to insurance and other business management problems. Includes instruction in forecasting theory, quantitative and non-quantitative risk measurement methodologies, development of risk tables, secondary data analysis, and computer-assisted research methods.

CIP Program Title:
Actuarial Science

Institution Program Title:
Actuarial Science

Degree Level/Type

Degree Level:
Bachelor's Degree

Degree Type:
Bachelor of Science

Options Added:

Collaborative Program**:**
N

Mode of Delivery

Current Mode of Delivery

Hybrid

Student Preparation

Special Admissions Procedure or Student Qualifications required:
None

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Specific Population Characteristics to be served:
n/a

Faculty Characteristics

Special Requirements for Assignment of Teaching for this Degree/Certificate:
Fontbonne is accredited by the Higher Learning Commission (HLC) and complies with HLC minimum faculty qualifications. In particular, faculty generally must have a degree in the discipline that is one level higher than offered. In doctoral programs, faculty must have a terminal degree and demonstrate research and accomplishments commensurate with a doctoral program. In some cases, we will also hire faculty that do not meet these criteria but do meet the "tested experience" criteria that we developed to comply with the HLC criteria.

Estimate Percentage of Credit Hours that will be assigned to full time faculty:
While this may vary depending on the year and the exact courses chosen by students (including general education courses), we estimate at least 60% of courses will be taught by full-time faculty.

Expectations for professional activities, special student contact, teaching/learning innovation:
All Fontbonne faculty are expected to be up-to-date on their discipline. Full-time faculty, as part of the annual review process, are expected to document professional activities and innovation in the classroom that improves student learning. Fontbonne maintains a low student to faculty ratio, and all faculty have extensive student contact.

Student Enrollment Projections Year One-Five

Year 1	**Full Time:** 5	**Part Time:** 0	
Year 2	**Full Time:** 5	**Part Time:** 0	
Year 3	**Full Time:** 5	**Part Time:** 0	**Number of Graduates:** 2
Year 4	**Full Time:** 5	**Part Time:** 0	
Year 5	**Full Time:** 5	**Part Time:** 0	**Number of Graduates:** 3

Percentage Statement:
n/a

Program Accreditation

Institutional Plans for Accreditation:
not applicable

Program Structure

Total Credits:
120

Residency Requirements:
n/a

General Education Total Credits:
42

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Major Requirements Total Credits:
64

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
ECN 210	3	Principles of Macroeconomics
MTH 151	4	Calculus with Analytic Geometry II
MTH 250	4	Calculus with Analytic Geometry III
MTH 200	3	Linear Algebra
ASC 206	3	Mathematical Theory of Interest
MTH 300	3	Modeling and Numerical Approximation
MTH 310	3	Differential Equations
ASC 288	0	Portfolio A
ACT 210	3	Financial Accounting
MTh 150	4	Calculus with Analytic Geometry I
CIS 200	3	Scientific Computing Languages
ASC 498	1	Senior Portfolio
ASC 306	3	Financial Mathematics for Actuaries I - Discrete Time
ASC 356	3	Financial Mathematics for Actuaries - Continuous Time
ECN 220	3	Principles of Microeconomics
CIS 216	3	Programming for Everyone II
ASC 499	3	Senior Synthesis
ASC 406	3	Actuarial Science and Risk Management with R
MTH 325	3	Theory and Applications of Probability
ACT 310	3	Intermediate Accounting
FIN 310	3	Managerial Finance
MTH 115	3	Introduction to Statistics

Free Elective Credits:
14

Internship or other Capstone Experience:
Successful completion of the capstone course

Assurances

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I certify that the program will not unnecessarily duplicate an existing program of another Missouri institution in accordance with 6 CSR 10-4.010, subsection (9)(C) Submission of Academic Information, Data and New Programs.

I certify that the program will build upon existing programs and faculty expertise.

I certify that the institution has conducted research on the feasibility of the proposal and it is likely the program will be successful. Institutions' decision to implement a program shall be based upon demand and/or need for the program in terms of meeting present and future needs of the locale, state, and nation based upon societal needs, and/or student needs.

Contact Information

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Fontbonne University 2023-2024 Undergraduate and Graduate Catalog

Actuarial Science, B.S.

The Bachelor of Science degree in Actuarial Science will provide students with the skills necessary to begin a successful career as an actuary. The curriculum was developed with input from multiple Fortune 500 companies and professional actuaries to identify the key areas that are needed for students to be successful actuaries. These key areas are: (1) Programming skills, especially Python and R, (2) An emphasis on the practical actuarial science courses of most value to the super majority of actuaries, (3) Time and credit hours to explore a wide range of liberal arts courses. The BS degree from Fontbonne addresses all 3 of these key areas. Graduates of the program will possess a broad knowledge base and preparation to take three Society of Actuaries exams and their Casualty Actuarial Society equivalents.

Student Learning Outcomes

The student outcomes for the BS in Actuarial Science degree program are the following:

This program is intended to build from a strong liberal arts foundation, while providing students with the most relevant skills in actuarial science. The BS degree in Actuarial Science is designed to prepare students to take three Society of Actuaries exams and their Casualty Actuarial Society equivalents.

1. Successfully sit for the Society of Actuaries Probability Exam (Exam P) and the roughly equivalent Exam 1 - Probability offered by the Casualty Actuary Society.
2. Successfully sit for the Society of Actuaries Financial Mathematics (FM) Exam and the roughly equivalent Exam 2 - Financial Mathematics offered by the Casualty Actuary Society.
3. Successfully sit for the Society of Actuaries Investment and Financial Markets (IFM) Exam, and the roughly equivalent Exam 3F

In addition, students will be able to

- Work on a team to tackle a problem by acquiring data, performing analysis, and using R Markdown to present professionally written results to a broad audience.
- Understand qualitatively and quantitatively the application of a wide variety of interest algorithms to diverse financial investments, including yield curves and the impact of arbitrage-forbiddance on the time-value of money.
- Generate and analyze bond and loan amortization schedules for a variety of circumstances - such as debt refinancing, property & casualty loss, and/or life contingency analysis.
- Describe how derivative contracts are connected to forwards and put/call options, and the profit functions of those contracts.
- Characterize the fundamentals of the R programming language, RStudio and R Markdown, and use these tools to complete a range of projects.
- Understand how to structure, price, and protect different investment strategies.
- Demonstrate the use of simulations and modeling (e.g., Black-Scholes-Merton (BSM), Monte-Carlo, Brownian,

Vašíček, Cox-Ross-Ingersoll, and Black-Derman-Toy) to effectively price options, stocks, bonds, futures, assets, and currency.

- Use put/call parity to quantitatively relate option prices, risk-free lending rates, dividend rates, and asset prices.
- Apply "Greeks" to derivatives, options, and portfolio hedging.
- Effectively use technology to quickly solve practical problems in actuarial science.

Mathematics Core (27 Credits)

- MTH 115 - Introduction to Statistics **Credit(s): 3**
- MTH 150 - Calculus with Analytic Geometry I **Credit(s): 4**
- MTH 151 - Calculus with Analytic Geometry II **Credit(s): 4**
- MTH 200 - Linear Algebra **Credit(s): 3**
- MTH 250 - Calculus with Analytic Geometry III **Credit(s): 4**
- MTH 300 - Modeling and Numerical Approximation **Credit(s): 3**
- MTH 310 - Differential Equations **Credit(s): 3**
- MTH 325 - Theory and Applications of Probability **Credit(s): 3**

Actuarial Science Core (16 Credits)

- ASC 206 - Mathematical Theory of Interest **Credit(s): 3**
- ASC 288 - Portfolio A **Credit(s): 0**
- ASC 306 - Financial Mathematics for Actuaries I - Discrete Time **Credit(s): 3**
- ASC 356 - Financial Mathematics for Actuaries II - Continuous Time **Credit(s): 3**
- ASC 406 - Actuarial Science and Risk Management with R **Credit(s): 3**
- ASC 498 - Senior Portfolio **Credit(s): 1**
- ASC 499 - Senior Synthesis **Credit(s): 3**

Computer Science Core (6 Credits)

- CIS 200 - Scientific Computing Languages **Credit(s): 3**
- CIS 216 - Programming for Everyone II **Credit(s): 3**

Courses Required in Other Disciplines (15 Credits)

- ACT 210 - Financial Accounting **Credit(s): 3**
- ACT 310 - Intermediate Accounting I **Credit(s): 3**
- ECN 210 - Principles of Macro Economics **Credit(s): 3**
- ECN 220 - Principles of Micro Economics **Credit(s): 3**
- FIN 310 - Managerial Finance **Credit(s): 3**

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