SPRING 2019 - ACMA 490 D300

SELECTED TOPICS IN ACTUARIAL SCIENCE (3)
Applied Probability Model

Class Number: 8472   *Delivery Method: In Person*

COURSE TIMES + LOCATION:

Tu, Th 10:30 AM – 11:20 AM

AQ 5025, Burnaby

INSTRUCTOR:

Jean-Francois Begin

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Office: SC-K10548

PREREQUISITES:

Dependent on the topic covered.

Description

CALENDAR DESCRIPTION:

The topics included in this course will vary from term to term depending on faculty availability and student interest.

COURSE DETAILS:

This course is divided into eleven chapters.

Chapter 1, Probabilistic Foundations : Sample Space, Random Variable, Probability Measure, Distribution, Sigma-Algebra, Measurable Space, Probability Triple.

Chapter 2, Stochastic Processes : Stochastic Process, Filtration, Stopping Time.

Chapter 3, Expectations : Independence, Conditional Probability, Expectation, Moments, Conditional Expectation.

Chapter 4, Martingales : Definition, Examples, Stopped Process, Optional Stopping Theorem, Markov Process.

Chapter 5, Introduction to Discrete-Time Market Models : Price Processes, Measurable Space, Arbitrage, Pricing, Two-Period Generalization.

Chapter 6, Advanced Discrete-Time Market Models : Price Systems and Martingale Measures, Self-Financing Strategy and Arbitrage, Arbitrage and Martingale Measures, Attainable Claims and Price Uniqueness, Admissible Strategy and Martingales, Relationship Between Replication and Pricing, Risk-Neutral and Martingale Measures, Market Completeness.

Chapter 7, Convergence : Metric Spaces, Almost Sure Convergence, Convergence in Probability, Convergence in Mean, Convergence in Distribution

Chapter 8, Brownian Motion : Normal Distribution Review, Scaled Random Walks, Brownian Motion, Construction of the Brownian Motion.

Chapter 9, Stochastic Integral : Riemann Integration, Ito Integration.

Chapter 10, Stochastic Differential Equations and Itō's Lemma : Ordinary Differential Equations, Ito's Lemma, Product Rule, Multidimensional Ito's Lemma, Solutions of Stochastic Differential Equations.

Chapter 11, Girsanov's Theorem and Change of Measures : Change of Measure, Radon-Nikodym Theorem, Girsanov's Theorem, Multidimensional Girsanov's Theorem.

Grading

In-Class Activities	20%
Midterm Exam	40%
Final Exam	40%

NOTES:

Above grading is subject to change

Materials

RECOMMENDED READING:

Hull, J. C. (2015). Options, Futures, and Other Derivatives, 9th ed. Pearson.

Lyaso, A. (2017). Stochastic Methods in Asset Pricing. The MIT Press.

McDonald, R. L. (2015). Derivatives Markets, 3rd ed. Pearson.

Shreve, S. (2004). Stochastic Calculus for Finance I : The Binomial Asset pricing Model. Springer Science & Business Media.

Shreve, S. (2004). Stochastic Calculus for Finance II : Continuous-Time Models. Springer Science & Business Media.

DEPARTMENT UNDERGRADUATE NOTES:

Students with Disabilites:
Students requiring accommodations as a result of disability must contact the Centre for Accessible Learning 778-782-3112 or csdo@sfu.ca

Tutor Requests:
Students looking for a Tutor should visit http://www.stat.sfu.ca/teaching/need-a-tutor-.html. We accept no responsibility for the consequences of any actions taken related to tutors.

REGISTRAR NOTES:

SFU's Academic Integrity web site http://www.sfu.ca/students/academicintegrity.html is filled with information on what is meant by academic dishonesty, where you can find resources to help with your studies and the consequences of cheating. Check out the site for more information and videos that help explain the issues in plain English.

Each student is responsible for his or her conduct as it affects the University community. Academic dishonesty, in whatever form, is ultimately destructive of the values of the University. Furthermore, it is unfair and discouraging to the majority of students who pursue their studies honestly. Scholarly integrity is required of all members of the University. http://www.sfu.ca/policies/gazette/student/s10-01.html

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