

**Selected Topics in Financial Engineering - CONTINUOUS TIME FINANCE**  
**FRE GY.6981**  
**Tuesdays 2:00-4:41pm**  
**Rogers Hall Room 302**  
*updated February 5, 2019*

**Instructor:** Assistant Professor Conall O’Sullivan

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Office Hours: Tuesdays 11:00am -12:00pm or email to arrange an appointment.

**Teaching Assistant:**

Phone:

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**Special Dates:** First lecture Jan. 29. Last lecture Mar. 5. Final exam Mar. 12.

**Pre-requisites:** Derivative Securities and Stochastic Calculus, or equivalent.

**Content:** This is a “second course” in arbitrage-based pricing and hedging of derivative securities. It differs from the “first course” in that all of the analysis will be conducted in continuous time (although we may use discrete time models to enhance intuition.) We will revisit topics from both the introductory derivative securities class and the stochastic calculus class. In both cases, we will emphasize the connection to trading and hedging in continuous time.

**Course requirements:** There will be two homework sets. Collaboration on homework is encouraged (homeworks are not exams) but registered students must write up and turn in their solutions individually. There will be one final exam on Mar. 19, which is open book, but not open device (to prevent communication). Half the grade is based on assignments; the other half is based on the final exam.

**Lecture notes:** Lecture notes can be downloaded from Albert. Homework sets will be posted on Albert.

**Textbook:** The required text is Tomas Bjork’s “Arbitrage Theory in Continuous Time”, Third edition.

Please turn over for the schedule.

**CONTINUOUS TIME FINANCE Spring 2018**  
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Class	Date	Topic	Bjork Lecture/Chapter
1	Jan. 29	Stochastic Integrals	L1,L2 Ch 4-5
2	Feb. 5	Black Scholes	L3a Ch 6-7
3	Feb. 12	The Martingale Approach I,II: Mathematics	L4, L5 Ch 10-12
4	Feb. 19	Dividends, Forwards, Futures & Futures Options	L6, Ch 16, 26
5	Feb. 26	Currency Derivatives and Change of Numeraire	L7, Ch 17 and L8 Ch 26
6	Mar. 5	Finish off previous material and Review	L7, Ch 17 and L8 Ch 26
7	Mar. 12	Final Exam	