

# **Finance Theory PhD Course**

**Semester One 2021**

## **Instructor: Professor Tom Smith**

Tom's research interests are in the areas of Environmental Finance, Asset Pricing Theory and Tests; Design of Markets - Market Microstructure and Derivatives. His articles have appeared in leading journals including the Journal of Financial Economics, Journal of Finance, Review of Financial Studies, Journal of Financial and Quantitative Analysis, Journal of Business, Journal of Law and Economics, Journal of Accounting Research. Tom is particularly proud of all of his PhD students and the fact that they have more than 50 tier 1 publications in the Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Financial and Quantitative Analysis and Journal of Business. Tom's students credit the PhD course work in Finance Theory and Finance Empirical as providing a great base for their research careers.

## **Overview**

This course, which is the first in the sequence of doctoral seminars offered in finance, is designed to introduce students to the major models of asset pricing and to rational expectations models. All of the material is developed from first principles, so there are no formal prerequisites for taking this seminar. It is assumed, however, that students are familiar with basic microeconomic theory and have a working knowledge of both calculus and matrix algebra. The outline that follows provides a brief description of the material that is covered in the course. The course consists of three 2 Day Modules which deal with three broad categories of asset pricing models: single-period static models and discrete time intertemporal models (Module 1), continuous time mathematics, Black Scholes and continuous time models (Module 2) and finally rational expectations models: fully revealing equilibrium, noisy rational expectations equilibrium, the Kyle model, its extensions and future directions (Module 3). The general approach will be:

- to examine the economic intuition behind each model
- provide a mathematically rigorous derivation of the model
- discuss the model's important features, and
- outline the testable implications of the model.

## **Textbooks**

There are no required texts for this course. The following books are useful references:

- Huang and Litzenberger, 1988 *Foundations for Financial Economics*, North-Holland (Elsevier Science Publishing, New York).
- Ingersoll, 1987 *Theory of Financial Decision Making*, Rowan and Littlefield (Totowa, NJ).
- Cochrane, 2005 *Asset Pricing Revised Edition*, Princeton University Press.
- O'Hara, 1995 *Market Microstructure Theory*, Blackwell Publishers, Cambridge Mass.

## **Grading**

There will be two assignments in the course. These assignments can be done either individually or in groups but group work is encouraged as this helps to develop a cohort which is very valuable to you as your research career goes forward. Each group will get a chance to present solutions to the problems in class. This gives the other students in the class a chance to see how a particular group approached the problems, and also provide members of the presenting group with an opportunity to develop their presentation skills. In addition to the assignments, there will be a final exam.

The exam will be 3 hours in duration and will be closed book, closed notes. The assignments determine 40% of the course grade; the remaining 60% is based on the performance on the final exam.

## **Venue**

The class will be online this year with a zoom session 12-2pm on Saturday for each module.

## **Timetable**

Module 1 Weekend of 20/21 March

Module 2 Weekend of 24/25 April

Module 3 Weekend of 15/16 May

Final Exam: Thursday June 10 2-5pm

## **List of Topics**

The following is a list of topics that will be covered in the course along with the associated reading assignments. A set of class notes will be available.

### ***Module 1 Discrete Time Models***

#### *The Capital Asset Pricing Model (CAPM)*

- Class Notes
- Huang and Litzenberger chapters 3 and 4
- Ingersoll chapters 3 and 4

#### *The Arbitrage Pricing Theory (APT)*

- Class Notes
- Ingersoll chapters 2 and 7

#### *State Preference Models*

- Class Notes
- Huang and Litzenberger chapters 5, 6, and 7

#### *The Lucas Model*

- Class Notes
- Ingersoll chapters 10 and 11

#### *The Pricing Kernel Approach: Putting the Models together*

- Class Notes

## ***Module 2 Continuous Time Models***

### *Continuous Time Mathematics*

- Class Notes
- Ingersoll chapters 12 and 16

### *The Black--Scholes Option Pricing Model*

- Class Notes
- Ingersoll chapter 14

### *The Merton Model*

- Class Notes
- Ingersoll chapter 13

### *The Breeden Model*

#### Class Notes

- Ingersoll chapter 15

### *The Cox--Ingersoll--Ross Model (CIR)*

- Class Notes
- Ingersoll chapter 18

## ***Module 3 Rational Expectations Models***

### *The Grossman Model*

- Class Notes

### *The Admati Model*

- Class Notes

### *The Kyle Model*

- Class Notes

### *Extensions of the Kyle Model and future directions*

- Class Notes

### *Review of the Course*