

Syllabus

Continuous-Time Finance FINE 702

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Office Hours: **TBD**, Bronf 549, or by appointment

Schedule

Meets: Wed, 2:35PM-5:25PM, Bronf **TBD**

Final Exam: Date **TBD**, time **TBD**, location **TBD**, written exam

Focus

This course develops the theory of dynamic asset pricing and equilibrium under uncertainty. The course examines continuous-time models of asset pricing with Itô-process dynamics (e.g., the Black-Scholes stock option pricing model). In different types of market settings (complete markets, incomplete markets, markets with incomplete information, markets with heterogeneous agents), we shall successively ask—but not always be able to answer—three questions:

- How to replicate and price redundant securities?
- How to obtain optimal portfolios of nonredundant securities?
- How to determine the equilibrium in a market populated with optimizing investors?

The course is NOT a course in Applied Mathematics. It is a course designed to show you how to do Economics with a special type of Applied Mathematics used purely as a tool.

The course will cover among other things: dynamic optimization and portfolio selection in continuous time, equilibrium in continuous time, Black-Scholes and redundant securities, term structure models, stochastic volatility models, the equity-premium and other puzzles, habit formation, recursive utility.

Towards the end of the course, we will apply the above techniques to study incomplete information, Bayesian learning, and economies with heterogeneous beliefs. This part of the course will be based on recent research papers.

Organization of the Course

The course will be in a traditional lecture format, with a final exam. There are several problem sets (to be submitted). These problem sets will help you prepare for the final and will contribute to your final grade. In addition, each student will have to write a referee report and prepare a conference-style presentation & discussion of the same paper. I will give more details about homeworks during the first class.

Course Materials

All class materials (slides, readings, problem sets) will be available on [myCourses](#).

Textbooks for the course

I will use materials from these textbooks:

1. Dumas and Luciano (2017), *The Economics of Continuous-Time Finance*, The MIT Press, 2017
2. Ziegler (2012), *Incomplete Information and Heterogeneous Beliefs in Continuous-Time Finance*, Springer-Verlag, 2003
3. Munk (2013), *Financial Asset Pricing Theory*, Oxford University Press.

Grades

50% final exam, 25% problem sets, 20% referee report & presentation, 5% class participation.

Language of Submission In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded. This does not apply to courses in which acquiring proficiency in a language is one of the objectives.

Academic Integrity McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (click [here](#) for more information).

References

- [1] Dumas, B. and E. Luciano (2017). *The Economics of Continuous-Time Finance*. MIT Press.
- [2] Munk, C. (2013). *Financial Asset Pricing Theory*. Oxford University Press.
- [3] Ziegler, A. C. (2012). *Incomplete information and heterogeneous beliefs in continuous-time finance*. Springer Science & Business Media.