

Department of Economics  
UNC-Chapel Hill  
Econ 890

Spring 2009

Syllabus  
Stochastic Processes for  
Finance and Macroeconomics:  
1. Discrete Time

**Meeting times and place:**

Tuesday from 11:00am to 12:15pm, Gardner 209  
Thursday from 11:00am to 12:15pm, Gardner 209.

**Professor:**

Eric RENAULT

**How to reach me:**

My office is located in Gardner Hall 300G. My office phone number is 966-5326.  
I will hold office hours on Wednesday from 2:30pm to 4:30 pm.  
My email address is [renault@email.unc.edu](mailto:renault@email.unc.edu)

**Evaluation:**

The grade for the course will be based on three homework sets, each with weight of 10%, a midterm exam (30%) and a final exam (40%).

**Homework sets:** They require that you derive theoretical results from theorems proven in class.

**Midterm exam:** The midterm will have the same format as the homework.

**Final exam:** The final will be cumulative, i.e. cover all the chapters since the beginning of the semester. The format is similar to homework and midterm.

The use of personal handwritten notes and of the four recommended textbooks (see below) will be allowed during the exams. No other book will be allowed.

The grading will be numerical (the maximum grade being 20), which will then be converted to H, P, L or F.

**Prerequisite:**

Economics 770 “Introduction to Econometric Theory”

Or some knowledge of measure-theoretic probability as in:

*Probability Essentials*

Jean Jacod and Philip Protter (2000)

Springer

**Overview of the course:**

1. Dynamic Arbitrage Pricing Theory
2. Martingales
3. Markov processes
4. Stationarity and Ergodicity
5. Permanent and Transitory Components in a Time Series.

**Recommended textbooks:**

For part 1:

*Stochastic Finance: An Introduction in Discrete Time*  
Hans Follmer and Alexander Schied (2002)  
De Gruyter Studies in Mathematics

For parts 2,3 and 4:

*Probability: Theory and Examples*  
Richard Durrett (1996)  
Duxbury Press

And

*Probability with Martingales*  
David Williams (1991)  
Cambridge University Press

For part 5:

*Time Series Analysis*  
James D. Hamilton (1994)  
Princeton University Press

**Additional textbooks of interest:**

*Stochastic Calculus for Finance:*  

1. *The Binomial Asset Pricing Model*
2. *Continuous-Time Models*

Steven E. Shreve (2004)  
Springer

*Introduction to Mathematical Finance*  
*Discrete Time Models*  
Stanley R. Pliska (1997)  
Blackwell