

Extended Syllabus (2018 Fall Semester)

Course Title	ECONOMETRICS FOR FINANCIAL TIME SERIES	Course Number	ECO4032
Credit	3	Enrollment Eligibility	Introduction to Econometrics
Class Time	M 10:30-11:45, W 10:30-11:45	Classroom	To be announced

Instructor's Photo	Name: Choi, In	Homepage: http://inchoi.sogang.ac.kr
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	Office: GN 707 Office Hours: M 13:00-15:00, Tu 13:00-15:00, W 13:00-15:00, or by appointments	

I . Course Overview

1. Description					
<p>This course introduces basic concepts and techniques for financial time series analysis. This course introduces major econometric models used for financial time series and the inferential procedures for these models. The econometric models that will be discussed are linear regression, autoregressive moving average (ARMA), autoregressive conditional heteroskedasticity (ARCH) and vector autoregressive (VAR) models. Whether asset returns are predictable will also be discussed. Last, major asset pricing theories like capital asset pricing model and arbitrage pricing theory will be covered from an empirical viewpoint. This course requires students to perform data analysis by using real data and PC. How to use the required software will be discussed in class.</p>					
2. Prerequisites					
Knowledge in statistics and econometrics					
3. Course Format (%)					
Lecture	Discussion	Experiment/Practicum	Field study	Presentations	Other
80%	5%	10%	0%	5%	0%

4. Evaluation (%)

mid-term Exam	Final exam	Quizzes	Presentations	Projects	Assignments	Participation	Other
30%	50%	0%	0%	10%	10%	0%	0%

II. Course Objectives

This course has the following objectives.

1. Understand basic time series models such as ARMA, ARCH, GARCH, VAR, etc.
2. Learn some research topics in financial time series analysis
3. Learn how to use Matlab or Python
4. Learn how to write a research report using time series methodology

III. Course Format

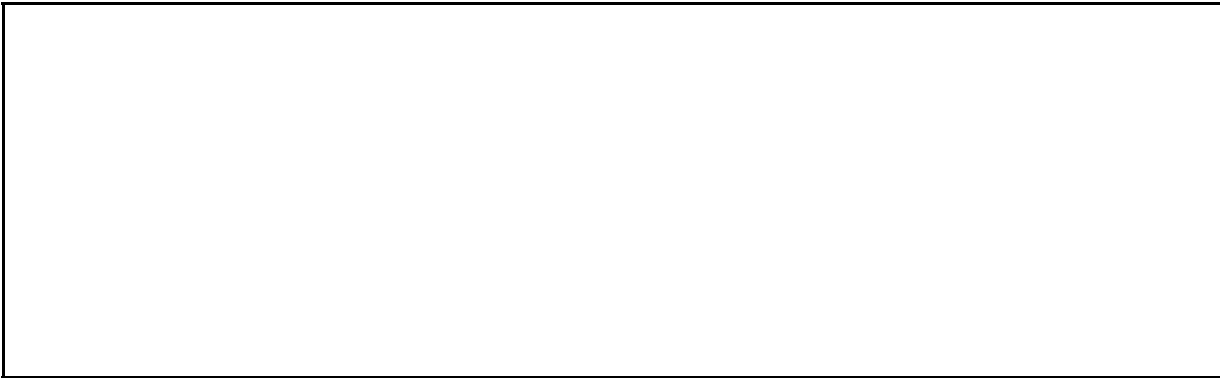
(* In detail)

This course consists of lectures by the instructor, practices for Matlab and presentations of research reports by students at the end of the semester.

IV. Course Requirements and Grading Criteria

Students are required to submit solutions for home assignments and research report. Final grades depend on home assignments, report, midterm examination and final examination.

V. Course Policies



VI. Materials and References

Text: Tsay, R.S. (2005) Analysis of Financial Time Series. 2nd edition. Wiley: New Jersey.

References:

Time series analysis in general

- Brockwell, P.J. and R.A. Davis (2002) Introduction to Time Series and Forecasting, 2nd edition, Springer-Verlag.
- Diebold, F.X. (1998) Elements of Forecasting, South-Western College Publishing. (Elementary introduction to forecasting. Readable for undergraduate students.)
- Harvey, A.C. (1993) Time Series Models, MIT Press, Cambridge, Massachusetts. (Introduces basic time series models. Not too technical.)
- Fuller, W. (1996) Introduction to Statistical Time Series, Wiley, New York. (Standard graduate-level text for time series analysis. Requires some knowledge on probability theory.)

Financial time series

- Campbell, J.Y., A.W. Lo and A.C. MacKinlay (1997) The Econometrics of Financial Markets. Princeton University Press: New Jersey. (Graduate-level text in financial time series.)
- Cuthbertson, K. and D. Nitzsche (2004) Quantitative Financial Economics. Wiley: New Jersey. (Discusses major topics in finance from an empirical viewpoint.)
- Koop, G. (2006) Analysis of Financial Data. Wiley: Chichester. (Undergraduate text in financial econometrics.)

Econometrics:

- Stock, J. and M. Watson (2003) Introduction to Econometrics, Addison Wesley.
- Greene, W.H. (2003) Econometric Analysis, 5th Edition. Prentice Hall.

Asset Pricing:

- Campbell, J.Y. (2018) Financial Decisions and Markets: A Course in Asset Pricing. Princeton University Press.

VII. Course Schedule

(* Subject to change)

Week 1	Learning Objectives	Basic concepts in financial econometrics
	Topics	Asset returns Present value
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Tsay, Chapter 1
	Assignments	To be distributed
Week 2	Learning Objectives	Basic concepts in financial econometrics
	Topics	Distributional properties of returns
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Tsay, Chapter 1
	Assignments	To be distributed
Week 3	Learning Objectives	Matlab or Python
	Topics	Basic commands
	Class Work (Methods)	Lecture and practice

	Materials (Required Readings)	To be distributed
	Assignments	To be distributed
Week 4	Learning Objectives	Linear regression and autoregressive and moving average (ARMA) model
	Topics	Stationarity and autocorrelation function White noise and linear processes
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Tsay, Chapter 2
	Assignments	To be distributed
	Learning Objectives	Linear regression and autoregressive and moving average (ARMA) model
Week 5	Topics	ARMA and ARIMA models Forecasting using ARMA models
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Tsay, Chapter 2
	Assignments	To be distributed
	Learning Objectives	Autoregressive conditional heteroskedasticity (ARCH) model
Week 6	Topics	ARCH model and its variants Stochastic volatility model
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Tsay, Chapter 3
	Assignments	To be distributed
	Learning Objectives	Autoregressive conditional heteroskedasticity (ARCH) model
Week 7	Learning Objectives	Autoregressive conditional heteroskedasticity (ARCH) model

	Topics	Realized volatility Volatility forecasting
	Class Work (Methods)	Lecture
	Materials (Required Readings)	Tsay, Chapter 3
	Assignments	To be distributed
Week 8	Learning Objectives	Midterm week
	Topics	
	Class Work (Methods)	
	Materials (Required Readings)	
	Assignments	
Week 9	Learning Objectives	Vector autoregressive model
	Topics	Impulse-response analysis
	Class Work (Methods)	Lecture
	Materials (Required Readings)	To be distributed
	Assignments	To be distributed
Week 10	Learning Objectives	Vector autoregressive model
	Topics	Forecasting
	Class Work (Methods)	Lecture
	Materials (Required Readings)	To be distributed

	Assignments	To be distributed
Week 11	Learning Objectives	Asset return predictability
	Topics	Long-horizon stock return regressions
	Class Work (Methods)	Lecture
	Materials (Required Readings)	To be distributed
	Assignments	To be distributed
	Learning Objectives	Asset return predictability
Week 12	Topics	Evidence of return predictability Mean reversion of stock returns
	Class Work (Methods)	Lecture
	Materials (Required Readings)	To be distributed
	Assignments	To be distributed
	Learning Objectives	Capital asset pricing model
Week 13	Topics	Minimum variance frontier CAPM Testing for CAPM
	Class Work (Methods)	Lecture
	Materials (Required Readings)	To be distributed
	Assignments	To be distributed
	Week 14	Learning Objectives
Topics		APT Three factor model of Fama and French

	Class Work (Methods)	Lecture
	Materials (Required Readings)	To be distributed
	Assignments	To be distributed
Week 15	Learning Objectives	Presentations of research reports by students
	Topics	Topics chosen by students
	Class Work (Methods)	Presentation
	Materials (Required Readings)	None
	Assignments	To be distributed
Week 16	Learning Objectives	Final examination
	Topics	
	Class Work (Methods)	
	Materials (Required Readings)	
	Assignments	

VIII. Special Accommodations

For students with handicaps, assistance will be provided. The level of assistance will depend on the relevant circumstances.