

Course Syllabus

Instructor:	Myung- Jig Kim,
Course Number:	ECO3077
Course Name:	Financial Consulting
Credit:	3
College:	College of Economics & Finance
Semester:	Fall 2014
Language:	Korean
Office Hours:	TBA

Course Description:

This course is an introduction to data analysis and econometric modeling using applications in finance such as asset pricing, forecasting term structure of interest rates, strategic and tactical asset allocation, value at risk, and index tracking. Equivalently, this course is an introduction to computational finance and financial econometrics. As such, the course utilizes concepts from microeconomics, finance, mathematical optimization, data analysis, probability models, statistical analysis and econometrics.

The emphasis of the course will be on making the transition from an economic model of asset return behavior to an econometric model using real data. This involves: (1) specification of an economic model; (2) estimation of an econometric model; (3) testing of the assumptions of the econometric model; (4) testing the implications of the economic model; (5) forecasting from the econometric model. The modeling process requires the use of economic theory, probability models, optimization techniques and statistical analysis.

Topics in financial economics include asset return calculations, portfolio theory, index models, the capital asset pricing model and investment performance analysis. Mathematical topics covered include optimization methods involving equality and inequality constraints and basic matrix algebra. Statistical topics to be covered include probability and statistics (expectation, joint distributions, covariance, normal distribution, sampling distributions, estimation and hypothesis testing etc.) with the use of calculus, descriptive statistics and data analysis, linear regression, basic time series methods and the simulation of random data.

The course will mostly utilize Microsoft Excel for spreadsheet modeling, data analysis and statistical modeling. Eviews (econometrics software) and GAUSS (matrix computer language) will be occasionally introduced to supplement and to extend the data analysis and forecasting.

Goals:

1. To promote capacity as a financial consultant
2. To learn how to mix and apply various methods to solve real problems
3. To enhance research and communication skills

Credit:

Mid-term:	30%
Final:	40%
Assignment and Class Participation:	20%
Attendance:	10%

Class Rules:

- No makeup exams
- No late turn in
- Attendance is checked randomly

Textbooks:

1. (Main Textbook) **Financial Modeling and Consulting**
Myung-Jig Kim (Hanyang University) ©2008 (will be distributed in class in PDF files)
2. **Modern Portfolio Theory and Investment Analysis**, Sixth Edition (or later), by E.J. Elton, M.J. Gruber, S.J. Brown, and W.N. Goetzmann, Wiley, New York, 2003. (Recommended, but not required)
3. **Financial Modeling**, Second Edition, by Simon Benninga, Second Edition (or later), MIT Press, 2000. (Recommended, but not required)

Tentative Schedule:

	Topic	Sub-title	Description
1	Problems of Financial Econometrics: Introduction to Analyzing Financial Time Series Using Excel, EViews, and GAUSS	1 Quantitative methods to various financial problems 2 Computer programs to various financial problems	This subject focuses on being familiarized with quantitative methods and computer programs to various financial problems.
2	Probability, Statistics, and Regression Analysis	1 Probability Theory	Probability theory, statistics, and econometrics are key components

		<p>2 Statistics</p> <p>3 Regression Analysis</p>	<p>of applied econometric modeling. Key concepts and their applications will be reviewed under this subject.</p>
3	<p>Forecasting Tools: Univariate Time Series Models and Vector Time Series Models</p>	<p>1 Univariate Time Series Models</p> <p>2 Vector Time Series Models</p>	<p>Both univariate and vector time series models are frequently used in practice to generate forecasts for many variables such as CPI, GDP, stock prices, and exchange rates. ARIMA(p,d,q) model and VAR model will be reviewed under this subject.</p>
4	<p>Forecasting Tools (continued) Vector Time Series Models, Forecasting Volatility, and Numerical Optimizations</p>	<p>1 Vector Error Correction Models</p> <p>2 Forecasting Volatility</p> <p>3 Numerical Optimizations</p>	<p>Long-term vs. short horizon forecasting models are often differently constructed. For the long-term forecasting purpose, vector error correction model will be introduced. For forecasting volatility, parametric models such as GARCH and BEKK models are studied. In addition, the idea of numerical optimization and its implementation will be covered under this subject.</p>
5	<p>Mean Variance Portfolio Theory</p>	<p>1 Mean-variance optimization</p> <p>2 Efficient frontier</p>	<p>Modern portfolio theory heavily draws upon quantitative methods. In this subject, basic concepts of such theory will be reviewed.</p>
6~7	<p>Modern Portfolio Theory</p>	<p>1 Tracking error optimization</p>	<p>Modern portfolio theory extends the traditional mean variance portfolio theory in many directions.</p>

		<p>2 Safety first based optimization</p> <p>3 Simulation based optimization</p>	In this subject, tracking errors optimization, safety first rule, and the related concepts will be covered.
8	Models of Equilibrium in the Capital Markets: Capital Asset Pricing Model and Arbitrage Pricing Model	<p>1 Capital Asset Pricing Model (CAPM)</p> <p>2 Arbitrage Pricing Theory (APT)</p>	Two key models that allow one to compute expected returns will be discussed. A particular attention will be paid to the implementation of such models and the Bayesian modification.
9	Security Analysis: Valuation of stocks	<p>1. Present value model</p> <p>2. Stock selection</p>	After the tactical asset allocation, investment has to be made. In doing so, the valuation of stocks and bonds become important. This subject will discuss the issues that are related to such valuations.
10 11	Interest Rate Theory and the Pricing of Bonds	<p>1 Term Structure of Interest Rates</p> <p>2 Pricing of Bonds</p>	The econometric methods for modeling the term structure of interest rates will be discussed. Students will learn how to price various types of bonds and measures for risk management.
12	Risk Models	<p>1 Value at Risk</p> <p>2 Credit Value at Risk</p>	Credit risk models will be introduced under this subject.
13	Capital Adequacy: Basel II	<p>1 Theoretical background of Basel II framework</p> <p>2 The experience of Basel II implementation</p>	New Basel Accord, or better known as Basel II (and the current amendment known as Basel III), is the international framework for regulating the capital adequacy of banks. Theoretical background and the experience of Basel II implementation will be discussed.
14	Predicting Default and	1 Default prediction	Default prediction and credit rating

	Designing Credit Rating	models 2 Credit rating system	system are important means for banking business and risk management. The implementation of such models (system) will be discussed under this subject.
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Suggested Readings:

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