

**MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC
OF KAZAKHSTAN**

**SULEYMAN DEMIREL UNIVERSITY
FACULTY OF ECONOMICS**

**“CONFIRM”
Vice-rector on Academic Affairs**

**_____ Mr. Halit Yilmaz
“ ” _____ 2009**

**Educational Program: Baccalaureate
Specialty: 050506-Economics
Form of education: daytime**

SYLLABUS

**On the course DATA ANALYSIS AND ECONOMIC FORECASTING
Specialty050506 - Economics**

**Year: 4
Semester: 7
Number of credits: 2 (lectures - 1 hour, practical – 1 hour)
Instructor: Dr. Ken Szulczyk
Tel.: 229-7190
Office: #B108**

**ALMATY
2009**

Completed by: Instructor Dr. Szulczyk

The syllabus has been developed on the basis of the Typical and Working Programs of the course for students of Specialty 050506 - Economics

Agreed at the meeting of the Faculty of “Economics”

Minutes № __ of _____ 200____ .

Head of the Department _____ Dr. Mesut Yilmaz.

Approved by the Educational Methodical Committee of the Undergraduate Department

Minutes № __ of _____ 200____ .

Dean of the Faculty _____ Dr. Mesut Yilmaz.

Course: Data Analysis and Economic Forecasting

Code: ECO 401

Number of credits: 2

Instructor's name	Time and location		Contact
	Lectures	Practical	
Dr. Ken Szulczyk	#1 Tuesday 1: 30-2:20 #2 Tuesday 3:30 - 4:20	#1 Tuesday 2:30-3:20 #2 Tuesday 4:30-5:20	Tel: 229-7190 Cell: 8 7027238077

I. COURSE DESCRIPTION

Data Analysis and Economic Forecasting is an advance course for undergraduates. The course builds upon the econometrics course that the students have already taken. This course begins a review of multiple regression, its properties, and assumptions. Since forecasting almost exclusively entails prediction of future events, this course focuses heavily on time series analysis. Students are introduced to common forecasting techniques such as a variety of regressions that incorporate a trend variable, and ARMA and ARIMA modeling. Towards the end of the course, students are introduced to Vector Auto Regressions.

II .COURSE OBJECTIVES:

Upon successful completion of this course students will be able to:

1. Derive linear regression for the two variable case and k-variable case.
2. Proficient in Linear Algebra and solving matrix equations.
3. Proficient in statistical distributions, such as the z, t, and F distributions and their role in hypotheses testing.
4. Understand violations in Linear Regression and how to fix them.
5. Regression forecasting with a trend variable and composite forecasting.
6. Calculate forecasting error
7. Analyze time series data using the Autocorrelation and Partial Autocorrelation Functions.

8. Choose an appropriate Autoregressive Moving Average Model (ARMA) or an Autoregressive Integrative Moving Average Model (ARIMA).
9. Basic understanding of Vector Autoregressions (VARs).

III. LEARNING OBJECTIVES:

Students will learn the following topics:

1. Linear Regression and its assumptions
2. Statistical testing using the z, t, and F distributions
3. Multicollinearity
4. Heteroscedasticity
5. Autocorrelation
6. Mean Squared Errors (MSE)
7. Trend Forecasting
8. Composite Forecasting
9. Autocorrelation and Partial Autocorrelation Functions
10. Autoregressive Moving Average Model (ARMA)
11. Autoregressive Integrative Moving Average Model (ARIMA)
12. Vector Autoregressions (VARs).

IV. PRE-REQUISITS

Econometrics

V. TEXTBOOKS

Required Text:

Two E-books are used for this course and distributed freely to the students.

1. Mjelde, James. 2004. *Quantitative Analysis used in Agriculture*. Unpublished and available from Texas A&M University.
2. Brockwell, Peter J. and Richard A. Davis. 2002. *Introduction to Time Series and Forecasting*. Springer, 2nd Edition.

Required Reading: Students are encouraged to surf the Internet for relevant information for classroom topics. Three websites have a wealth of information, including free electronic textbooks:

1. <http://statpages.org/javasta3.htm>
2. <http://www.oswego.edu/~economic/newbooks.htm>
3. www.wikipedia.org

VI. PROCEDURES AND REQUIREMENTS:

1. **Class Participation** -- Students should come to class well prepared, having read the material assigned. They are encouraged to ask their questions, make comments, and participate in class discussions. Students who are late or absent are not properly participating in our class, regardless of how involved they may be when present.

2. **Attendance and Dishonesty** -- Students are required to attend classes on a regular basis. University policy will be followed when students miss their class appointments, or engage in any form of academic dishonesty. In both cases, students may be awarded a failing grade for their actions.

3. **Homework** -- Students are required to complete their homework on time. All homework requires Microsoft Excel. The homework complements the techniques the students learn from class and applies these techniques to analyze and forecast economic and financial data.

4. **Examinations** – There will be two mid-term exams and one final exam during the semester. The test questions will be short answer essay. Some questions will pertain to data analysis and forecasting in Excel, ensuring students are doing their homework for Excel.

5. **Late assignments** -- Late assignments will not be accepted. A zero will be recorded when cases, assignments, presentations, projects, or examinations are not completed at the regularly scheduled time.

VII EVALUATION

The course grade will be based upon the following criteria:

Assignment type	Week	Marks
Home work	1-7	15 %
Mid Term 1	7th week	15%
Home work	8-14	15%
Mid Term 2	14th week	15%
Final	16th week	40%
TOTAL		100%

VIII COURSE SCHEDULE AND READING ASSIGNMENTS:

The course schedule and assignments are listed below. This is your road map to the course, so please read it carefully.

Weeks	Topics of Lectures (2 hours per week)	Self study/ (2 hours per week)	Form of Control	Texts
1	Derivation of the Two-Variable Linear Regression and Properties of Estimators	Read chapters and prepare homework	Excel Homework 1	Read Chapters 7 and 9 in Mjelde
2	Review of Matrices and Derivation of Multiple Linear Regressions and its Properties	Read chapters and prepare homework	Excel Homework 2	Read Chapters 6 and 10 in Mjelde
3	Review of the z, t, and F distributions and Derivation of the ANOVA	Read chapters and prepare homework	Excel Homework 3	Read Chapter 12 in Mjelde
4	Inference and confidence intervals	Read chapters and prepare homework	Excel Homework 4	Read Chapter 13 in Mjelde
5	Goodness of Fit Measures such as R^2 , adjusted R^2 , Akaike Information Criterion (AIC), and Schwarz Information Criterion (SIC)	Read chapters and prepare homework	Excel Homework 5	Read handout
6	Violations of Multiple Regression, such as autocorrelation, multicollinearity and heteroscedasticity. Includes tests and corrections.	Read chapters and prepare homework	Excel Homework 6	Read handout
7	Midterm Examination I		15 points	Read handout
8	Forecasting using trend analysis, such as linear trend, quadratic trend, exponential growth, and moving average; Measuring prediction error with Mean Squared Errors (MSE) and Root Mean Squared Errors, and Composite Forecasting	Read chapters and prepare homework	Excel Homework 6	Read handout

9	Time series data; trends, seasonality, weakly stationary, and random walk process	Read chapters and prepare homework	Excel Homework 8	Read Chapter 1 in Brockwell and Davis
10	Autoregressive process (AR) and moving average process (MA).	Read chapters and prepare homework	Excel Homework 9	Review Chapter 1 in Brockwell and Davis
11	Review of the Pearson correlation and covariance. Then introduce the Autocorrelation function (ACF) and partial autocorrelation function (PACF) and their plots. Then tie the ACF and PACF to the AR and MA processes.	Read chapters and prepare homework	Excel Homework 10	Read Chapter 2 in Brockwell and Davis
12	Introduction to the ARMA(p, q) process and their graphs and forecasting.	Read chapters and prepare homework	Excel Homework 11	Read Chapter 3 in Brockwell and Davis
13	Introduction to the ARIMA(p,q) process and their graphs and forecasting	Read chapters and prepare homework	Excel Homework 12	Read Chapters 6.1 and 6.2 in Brockwell and Davis
14	Introduction to Vector Auto Regressions (VARs)	Read chapters and prepare homework	Excel Homework 13	Read handout
15	Midterm Examination II		15 Points	
	Final Exam		40 Points	
Total			100 points	

IX. References:

1. Greene, W.H. 2003. *Econometric Analysis*, Fifth Edition, Prentice-Hall.
2. Kennedy, P. 1998. *A Guide to Econometrics*, Fourth Edition, The MIT Press.
3. Judge, G.G., W.E. Griffiths, R.C. Hill, and T.C. Lee. 1985. *The Theory and Practice of Econometrics*, Second Edition, John Wiley & Sons.