SCHOOL OF FINANCE AND APPLIED ECONOMICS

BBS Finance & BBS Actuarial Science

COURSE OUTLINE

Unit Code and Title: BSE 2103: Introductory Econometrics

Lecturers: Dr. Hye-Sung Kim

Muthoni Ng'ang'a

Office: MSB basement staffroom

Email:kim.hyesung@gmail.com

mnganga@strathmore.edu **Office Hours:**

Purpose of the course:

To enable students to analyse economic data and establish relationships, estimations and forecasts using econometric methods.

Course Learning Outcomes:

After completing this course, the student should be able to:

1. Describe the nature of econometrics.
2. Discuss the assumptions that underpin the classical regression model.
3. Describe the fundamental techniques and applications of the simple and multiple regression models.
4. Apply regression analysis to data sets in order to carry out hypothesis testing and predictions.

Contact Hours: 45

Prerequisite: Probability and Statistics I, Algebra and Pre-calculus

Lectures:

	Topic and Intended Learning Outcomes	Activities
1	**CHAPTER 1: INTRODUCTION** ***Intended Learning Outcomes*** •Explain the meaning of Econometrics •Distinguish between different types of data sets •Make a distinction between causality and association ***Content*** ✓ Introduction to Econometrics ✓ Methodology of Econometrics ✓ Types of data ○ Cross Sectional data ○ Time series ○ Pooled Cross-Section ○ Panel data ✓ Causality and Association	• Class Discussions • Watch video related to causality. • Use Stata to analyse data. • Questions: Work through selected questions from Chapter 1.
2	**CHAPTER 2: SIMPLE REGRESSION MODEL** ***Intended Learning Outcomes*** •Define and estimate the simple regression model •Distinguish between the population regression function and the sample regression function •Define the residual •Explain what is meant by sum of least squares •Derive the Ordinary Least Squares Estimates •Describe the Properties of OLS Statistics •Discuss the Gauss-Markov Assumptions ***Content*** ✓ Estimation and interpretation of simple regression model ✓ Population regression function and the Sample regression function ✓ Sum of least squares; deriving the Ordinary Least Squares Estimates (OLS) i.e. estimating the parameters β_0 and β_1 ✓ Algebraic properties of OLS Statistics ✓ Gauss-Markov assumptions that must hold for OLS estimates to be unbiased.	• Class Discussions • Watch video explaining sum of least squares. • Use Stata to analyse data. • Questions: Work through selected questions from Chapter 2.

3	**CHAPTER 2 CONTINUED…..SIMPLE REGRESSION MODEL** ***Intended Learning Outcomes*** •Explain the Goodness of Fit for a model •Define the term 'Linear' •Explain the effects of changing units of measurement on OLS statistics ***Content*** ✓ Total Sum of Squares, Explained Sum of Squares and Residual Sum of Squares ✓ Goodness of Fit ✓ The meaning of the term 'Linear' ✓ Changing units of measurement of the variables ✓ Incorporating natural logarithms in a simple regression	•Class Discussions •Use Stata to analyse data. •Questions: Work through selected questions from Chapter 2.
4	**CHAPTER 3: MULTIPLE REGRESSION ANALYSIS: ESTIMATION** ***Intended Learning Outcomes*** •Discuss about a regression model with two independent variables and one with k independent variables •Explain how to interpret the OLS multiple regression equation •Compare and Contrast the simple and multiple regression estimates •Describe the Gauss-Markov assumptions under which the OLS estimates are unbiased ***Content*** ✓ The model with two independent variables and k independent variables ✓ Obtaining OLS estimates; interpreting OLS equation ✓ Meaning of 'holding other factors fixed' ✓ Goodness of Fit Gauss-Markov assumptions	•Class discussions •Questions: Work through selected questions from Chapter 3. Use Stata to analyse data

5	**CHAPTER 3 CONTINUED…. MULTIPLE REGRESSION ANALYSIS: ESTIMATION** ***Intended Learning Outcomes*** •Explain the issue of including irrelevant variables or excluding relevant variables in a regression model •Discuss the Homoskedasticity assumption •Discuss about the linear relationship among independent variables •Explain the importance of the Gauss-Markov Theorem, which justifies the use of OLS •Discuss about the 'language' used in multiple regression analysis. ***Content*** ✓ Overspecifying and underspecifying a regression model. ✓ Homoskedasticity; multicollinearity ✓ Efficiency of OLS: The Gauss-Markov Theorem Language on the multiple regression analysis.	•Class discussions •Questions: Work through selected questions from Chapter 3. •Use Stata to analyse data
6	**CHAPTER 4: MULTIPLE REGRESSION ANALYSIS: INFERENCE** ***Intended Learning Outcomes*** •Discuss the normality assumption of the error term. •Testing Hypotheses about a Single population Parameters •Construct and interpret confidence intervals for population parameters •Testing Hypotheses about a single linear combination of the parameters •Testing multiple linear restrictions ***Content*** • Sampling Distributions of the OLS Estimators • Hypotheses testing ✓T-Test ✓Confidence Intervals ✓F-Test	•Class discussions •Questions: Work through selected questions from Chapter 4. •Use Stata to analyse data.

7	**CHAPTER 5: MULTIPLE REGRESSION ANALYSIS: OLS ASYMPTOTICS** ***Intended Learning Outcomes*** •Discuss the Inconsistency in OLS ***Content*** ✓ Consistency ✓ Asymptotic Normality and Large Sample Inference Asymptotic Efficiency of OLS	•Class discussions •Questions: Work through selected questions from Chapter 5. •Use Stata to analyse data.
8	**CHAPTER 6: MULTIPLE REGRESSION ANALYSIS – FURTHER ISSUES** ***Intended Learning Outcomes*** •Discuss the effects of changing the units of measurement on OLS parameters •Interpreting parameters in different functional forms including logarithmic forms, quadratic functions •Evaluating regression models using adjusted R^2 •Obtain confidence interval for a prediction from the OLS regression line •Application of residual analysis ***Content*** ✓ Effects of Data Scaling on OLS Statistics ✓ More on Functional Form ✓ More on Goodness-of-Fit and Selection of Regressors Prediction and Residual Analysis	•Class discussions •Questions: Work through selected questions from Chapter 6. •Use Stata to analyse data
9	**CHAPTER 8**: **HETEROSKEDASTICITY** ***Intended Learning Outcomes*** •Detect heteroskedasticity •Explain the consequences of Heteroskedasticity •Discuss and perform corrections for heteroskedasticity ***Content*** •Consequences of Heteroskedasticity for OLS •Computing Heteroskedasticity- Robust LM Test •Heteroskedasticity Tests ✓ Park Test	•Class Discussions •Questions: Work through selected questions from Chapter 8. •Use Stata to analyse data.

	✓ White Test ✓ Breusch-Pagan •Remedial Measures of Heteroskedasticity Weighted Least Squares Estimation	
10	**CHAPTER 7: MULTIPLE REGRESSION ANALYSIS WITH QUALITATIVE INFORMATION: BINARY (OR DUMMY) VARIABLES** ***Intended Learning Outcomes*** •Interpreting Coefficients on Dummy Explanatory •Variables •Interpreting Regression Results with Discrete •Dependent Variables ***Content*** ✓ Describing Qualitative Information ✓ A Single Dummy Independent Variable ✓ Using Dummy Variables for Multiple Categories ✓ Interactions Involving Dummy Variables ✓ A Binary Dependent Variable: The Linear Probability Model	•Class Discussions •Questions: Work through selected questions from the Chapter. •Use Stata to analyse data.
11	**MORE ON SPECIFICATION AND DATA ISSUES** – **Chapter 9** ***Content*** ✓ Functional Form Misspecification ✓ Using Proxy Variables for Unobserved Explanatory Variables ✓ Properties of OLS under Measurement Error ✓ Missing Data, Non-random Samples, and Outlying Observations	Depends on the time left at the end of the semester☺

Academic Assessment

Type	Weighting (%)
Continuous Assessment Test 1	10%
Continuous Assessment Test 2	10%
Assignment	10%
Examination	70%
Total	**100 %**

Course Materials

Recommended material

1. Wooldridge, J. (2013). Introductory Econometrics: A Modern Approach (5th ed.). Mason, Cengage Learning. (We shall closely follow this text)
2. Gujarati D. (2004). Basic Econometrics (4th ed.). McGraw-Hill Companies.

Classes

1. **Punctuality** is fundamental.
2. Active participation in class discussions is encouraged

Assignments and/or Course Work

1. **Plagiarism** is a serious offence. If detected in any form in course work and assignments, the following will apply:
    a. In partial or non-serious cases (such as not citing whole word-for-word quotes), half the total possible marks of the assignment are duly struck off.
    b. In serious cases (such as whole duplication of a paper), a zero policy will apply i.e. all offending assignments will be awarded a mark of zero.

    Note: The level of seriousness referred to above is at the discretion of the lecturer. Appeals are certainly possible through the relevant channels.
2. **Referencing:** American Psychological Association (APA) Reference Style.
3. Notwithstanding the above, **collaboration** in course work is certainly encouraged as this promotes team spirit and group synergy as long provided originality is preserved.

Communication Channels: via Email and/or after class. In normal circumstance, the lecturer will aim to reply to your email within 2 working days.