ECON 230: Applied Economic Statistics

University of Maryland, Spring 2016
Sections: 0101 (12:00 – 12:50); MMH Room 1400
Sections: 0201 (1:00 – 1:50); MMH Room 1400

Dr. S Verma
Email: Verma@econ.umd.edu or SVermaPRC@gmail.com
Office: Morrill Hall 1102C
Office Hours: MWF 2:00 to 3:00
TAs/Graders:
JianKun Chen (Jkchen@umd.edu) Office Hrs:
Lerong Li (LerongLi@umd.edu) Office Hrs:
Wei Li (LiW1989@umd.ed) – Partial Grader

Prerequisite: Must have math eligibility of MATH111 or higher; or minimum grade of C- in MATH110. And minimum grade of C- in ECON200 and ECON201. Recommended: Students should already have basic familiarity with Microsoft Excel or similar spreadsheet software. Restriction: Must be in Economics Bachelor of Arts program. Credit only granted for: BIOM301, BMGT230, CCJS200, ECON230, ECON321, EDMS451, GEOG306, GEOL351, GVPT422, PSYC200 or SOCY201.

Textbook:
You are required to purchase access to LMS-integrated Aplia for Anderson/Sweeney/Williams Essentials of Modern Business Statistics w/Microsoft Excel, 6thEdition from Cengage Learning. Aplia will provide you with many of your assignments as well as an eTextbook. You have three options for purchasing access:

Option 1 – Buy Instant Access directly from Cengage within your Canvas course for *LMS-integrated Aplia for Anderson/Sweeney/Williams Essentials of Modern Business Statistics w/Microsoft Excel, 6th Edition*. The price is $75.08. To purchase using this option, click on any Cengage Aplia link in the Canvas course and choose to pay online (with credit card, debit card, or PayPal) instead of entering an Access Code.

Option 2 – Buy a Printed Access Card at the university bookstore for *LMS-integrated Aplia for Anderson/Sweeney/Williams Essentials of Modern Business Statistics w/Microsoft Excel, 6th Edition*, ISBN 9781305493155.

Option 3 – Buy a bundle at the university bookstore of the loose-leaf version of Anderson/Sweeney/Williams' *Essentials of Modern Business Statistics w/Microsoft Excel*, 6th Edition shrink-wrapped with a Printed Access Card for *LMS-integrated Aplia*, ISBN 9781305776869.

The text is a valuable reference resource, but not a substitute for lectures. Homework assignments will be given from the Text as well as other books and will be posted on www.elms.umd.edu

Grading:

First Exam	20%	Date: March 7
Second Exam	20%	Date: April 11
Aplia Quizzes	20%	Subject assignments
Final Exam	40%	Section 0101: Tuesday May 17, 8:00 to 10:00 am Section 0201: Friday May 13, 1:30 to 3:30 pm

No makeup or late submission for Subject assignments. Only one Makeup exam will be given on April 18, for Midterms exams with valid excuse as per University policy. For details visit http://www.testudo.umd.edu/soc/atedasse.html.

Attendance:

Attending class is utmost important for Subject assignments. Exams will be based on material covered in the class *plus* subject assignments. Laptop will be needed in every class.

Objective:

The objectives of this course are two folds: One, students would acquire basic understanding of statistical concepts used in research. Students would be able to perform descriptive statistical calculations using handheld calculators and Excel. They would acquire the ability to calculate and interpret statistical concepts such as simple probability, discrete probability distributions (Binomial and Poisson distribution), and Normal distribution -- point and interval estimations, and hypothesis testing of means and proportions. Students would learn to perform simple analysis of variance and estimate simple linear regression models.

Two, students would be able to demonstrate ability to apply statistical and inferential concepts using Excel and econometric package like SPSS. Even without having to do statistical analysis themselves, they would be able to demonstrate the ability to understand, analyze and interpret the results from research studies in economic literature. Students would have the ability to learn how statistical tools can be applied to model economic behavior and analyze relationships between economic variables. These learning goals will support other goals of the program: ability to analyze the effect of government policies on the economy using these statistical tools of the discipline.

Part I: Foundation and Descriptive Statistics

Introduction to Microsoft Excel and SPSS:

Students might have already learned Excel in High School, they would learn some techniques to data manipulation, graphing, and calculating descriptive statistics. *Laptop needed in class.*

Students will also be exposed to SPSS using Excel data files and perform descriptive statistics on large datasets. All questions and problem sets will be based on real life scenarios and economic applications.

Topics:

1. Types of Data: Interpretation and manipulation of data – Excel and SPSS
   Read Text Book -- Chapter 1
2. Descriptive Statistics: Text Chapter 2 and 3. Concept of Mean, Mode, Median, Quartiles, Percentiles, Standard Deviation, and Correlation

A calculator is needed in class. Students will learn to calculate descriptive statistics using a calculator, using Microsoft Excel, and using SPSS. (Subject Assignment)

Part II: Probability and Probability Distributions

Topics:

3. Introduction to Probability: Text Chapter 4. Concept of probability, Additive and Multiplicative law, Conditional probability. (*Calculator is needed in class.)*
4. Discrete Random Variables: Chapter 5. Expected Value. Variance and Covariance. Binomial and Poisson distribution. (*Calculator is needed in class.)*
5. Continuous Random Variables: Text Chapter 6. Normal Distribution, Normal curve, computing probabilities for any Normal curve. (*Calculator is needed in class.)*

Students will learn to apply appropriate probability distribution to solve question from real life applications. (Subject Assignment)

Part III: Statistical Inference

Topics:

6. Sampling and Sampling Distributions: Text Chapter 7. Types of Samples. Point estimation. Sampling Distribution of Mean and Proportion; Central Limit Theorem.
7. Intervals Estimation: Text Chapter 8. Confidence interval of mean and proportion.
8. Hypothesis Testing: Text Chapter 9. Null and Alternative Hypotheses. Testing of Means and Proportions. Type and Type II errors. Determining sample size.
9. Testing Difference of Means: Text Chapter 10.
10. Testing of variances -- Chi-square and F distribution: Text Chapter 10.
11. Test of Independence. Text Chapter 11.

Subject Assignments on each topic. Calculators/laptops are needed in class. Students will learn to test hypotheses about means and proportions and calculate the optimum sample size. SPSS will be used to test hypotheses using large datasets.

Part IV: Linear Regression Analysis

12. Simple Linear Regression Model: Text Chapter 12. Method of least squares. Assumptions and estimation of model coefficients, goodness of fit and forecasting.

    Students will learn to estimate a simple linear model (two variables) using a handheld Calculator/Excel, and a multiple regression model (many variables) using SPSS.

13. Interpretation of Multiple Regression Models. Text Chapter 13. Introduction to Multiple Regression (without estimation); interpretation of problems in model estimation such as multi-collinearity and heteroscedasticity.
    (Subject Assignments)

    Students will learn to interpret multiple regression model without having to estimate the model themselves. They would be able to demonstrate the ability to understand and interpret results from research studies done in economic literature. They would be aware of the problems faced in econometric estimation of such models.

SPSS is available on all PCs in McKeldin Library and Lefrak Hall lab. Students need NOT buy any manual for SPSS. However, a student copy of SPSS is available for $30. Students can borrow laptops from library for couple of hours which have SPSS program installed in them. Class instructions will be sufficient and will be provided by the instructor in the form of handouts. Thus attending classes regularly would be crucial to learn statistical concepts and apply them to research in economics.