Syllabus
ECON 3112.003
Econometrics
Belk College of Business, UNCC
Spring 2019

Instructor	: **Ercan Karadas**
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Office	: 227C Friday
Lectures	: M 14:30 - 15:45, Friday 130
	: W 14:30 - 15:45, CHHS 370 (Computer Lab)
Office Hours	: W 13:30 - 14:30 or by appointment

1 Course Description

This course introduces the statistical methods used to analyze economic data. In doing so, we might be interested in quantifying the relationship between certain variables. For instance, asking how consumption expenditures are related to income or how the wage of an individual is related to his or her education. We might also be interested in testing whether a theoretical relationship is supported by data. Probably you have heard of Okun's law, which relates the output growth to the unemployment rate. This is just a theoretical stipulation unless some econometric methods are used to find out whether it is supported by data. These methods are useful for those who want to become quantitative business and economic analysts, and also, for those interested in knowing how economics is applied to real-world problems.

The course begins with an introduction to statistics and probability. In this section, you will learn how to draw inferences about an entire population from sample information, data from a small subset of the population. Then we will begin studying the fundamental method of applied econometrics: the linear regression model. This method allows us to quantify the effect of changing one variable on another one through some parameters. The course focuses on estimation and interpretation of parameters, evaluation of goodness of fit, as well as, hypothesis testing. These issues will be studied first within the most straightforward case called "simple regression" in which the behavior of a dependent variable is explained by a single explanatory variable. For example, the dependent variable might be consumption expenditures of households and the explanatory variable household income.

Then, we will turn our attention to "multiple regression" in which we consider cases in which the dependent variable is influenced by more than one explanatory variable. For example, consumption expenditures depend on not only households' income but also the value of their assets. In both single and multiple regression we will be working under some simplifying assumptions but at the end of the section, we will relax some of these assumptions. Most importantly we will focus on problems such as heteroscedasticity and autocorrelation and we will also see how we can use "instrumental variables" to obtain more reliable results in certain cases.

In the last part of the course, we will briefly study some more specific models that have been devised to deal with particular data types: time series models, binary data models, and panel data models.

Prerequisites: Students must have completed the following courses with grades of C or above: (ECON 2101 or ECON 1201) and (ECON 2102 or ECON 1202) and (MATH 1120 or MATH 1241 or MATH 1242) and (STAT 1220 or STAT 1221 or STAT 1222) and INFO 2130.

2 Course Materials

- [**SW**] *Introduction to Econometrics* by Stock, J.H., and M.W. Watson (2015), 3rd Edition Updated, Pearson Education **(Required)**. You can use previous editions as well, especially 3rd edition should be fine.
- [**LS**] *Lecture Slides* Computer-projected overhead lecture slides accompanying **SW** will be posted on Canvas **(Required)**.
- [**MM**] *Mastering Metrics: The Path from Cause to Effect* by J. D. Angrist and J-Steffen Pischke (2015), Princeton University Press. **(Supplementary)**

The ultimate resource will be my lecture slides [**LS**] which will follow [**SW**] very closely most of the time, but in some cases I will add some more details or rearrange the material in the book.

Students are expected to have completed the readings ahead of class to facilitate class participation and discussion. You need to take this seriously to be able to make the most out of this class as we will cover a lot of advanced material in just one semester.

Class Website: I will post course related materials to the course Canvas page. Please, be sure to visit the course web page regularly, as all materials for the class, occasional messages and any changes in the schedule will be posted there.

3 Computer software

The course will make heavy use of the statistical software `R`. No prior knowledge of this programming language is assumed, it will be introduced in the first few weeks. It is essential to have a good command of `R` to complete this course successfully. Be familiar with `R` as soon as possible (if you are reading this syllabus before the first lecture, start now!). `R` has been increasingly being used in economics, finance and data science both in academia and private sector, so a good knowledge of `R` will not only help you with this course but will also improve significantly your prospect in job search and getting in better graduate programs. Putting in a small amount of effort to learn `R` should serve you well in the future.

It is better if you have `R` installed on your computer. It is available for all major computing platforms: Windows, Mac OSX, and Linux.

3.1 Installation Steps

1) Download and install the `R` binaries for your operating system, accepting all the defaults:

   http://cran.r-project.org/

2) Go ahead and download `Rstudio` too, again, accepting all defaults:

   http://www.rstudio.com/products/rstudio/download/

3.2 Some Online Resources for R

Below provided some links to get you started with `R`.

1. **Basics.** A free interactive course covering the basics of R:

   https://www.datacamp.com/courses/free-introduction-to-r

   Another one:

   https://www.codeschool.com/courses/try-r

2. **Basics + Stats.**

   http://www.cookbook-r.com/

   and

   https://www.statmethods.net/index.html

4 Course Evaluation

Course Evaluation will be based on 4 tests. I might also give you a few pop quizzes.

4.1 Practice Problems

Practice problems will be posted periodically throughout the semester. Practice problems will be a combination of theoretical exercises and empirical/computational/simulation exercises which you will do in R. I will discuss some of these problems in lectures but most of them will be left for you to practice. Completion of these problems is extremely important because it is an essential element in learning the course content and preparing for the exams.

You are encouraged to work on these problems in small groups. I will post the solutions for all the problems. However, it is very important that you look at the solution of a problem **only after** you can come up with a solution on your own or at least devote a significant amount of time to understand it. I know it is very appealing to jump to solutions without putting much effort to solve them yourself, but in that case they will be mostly useless in preparing you for the tests.

4.2 Tests

There will be four tests (the last one will be considered as the final exam). Each test could consist of three type of questions: i) multiple choice questions, ii) short answer questions, and iii) longer questions that require providing analytical solutions.

The exam content will be cumulative, but with an emphasis on the most recent material. All material discussed in the course is examinable unless stated otherwise.

A missed test will receive a grade of zero. The only exception to this policy is: you miss a test due to a serious medical emergency for which you notify me as soon as possible *before* the exam and you *must* provide a doctors note within one week of the test).

There is no make-up for the final test.

4.3 Grading

Your total score will be the weighted average of your scores from the four tests (equally weighted) and quizzes if applicable.

Once your total score is calculated, your letter grade from the course will be determined by the following scale:

Letter	Percentile
A	25 - 30%
B	30 - 35%
C	30 - 35%
D&F	15 - 0%

Grades will be based solely on your total score. No extra work or additional credit can be assigned to improve your grade.

5 Miscellaneous Course Policies

- **Attendance**

  Class attendance and participation are expected and required. There will an attendance sheet circulating each class.

- **Classroom disruption:**

  Any classroom behavior that interferes with the instructor's ability to conduct class, failure to conform to the faculty members announced expectations for the classroom, or the ability of other Students to learn will be considered as **disruptive.**

  Examples of disruptive behavior in the classroom include, but are not limited to:

  - Use of cell phones or other electronic devices for voice or text communication in class, unless permitted by the faculty member.

  - repeatedly leaving and entering the classroom during class without authorization

  - making loud and distracting noises

  - monopolizing classroom discussions

  - talking when the instructor or others are speaking

  - exhibiting erratic, irrational behavior

  - persisting in speaking without being recognized

  - behavior that distracts the class from the subject matter or discussion

  - refusal to comply with faculty direction

  - making hostile remarks to or about other students in the class, other groups of people or the instructor

  - making physical or verbal threats to the faculty member or fellow classmates

  - targeting individuals with disparaging comments because of their membership in a particular group

- **Communication with me**

  If you would like to meet me to ask your questions about the course material or the practice problems, here is the procedure you should follow:

  1. Drop in my office during one of my office hours (Wednesday, 13.30-14.30). I would strictly prefer you come to my office hours. In this case, you don't have to email me in advance and this should be your default choice.
  2. Another option is to ask me your questions right after lectures.
  3. However, if these two don't work for you for some reasons, send me an email to make an appointment. In this case, here is the guideline:
     - You should send me an email at least **two days** in advance of the date that you are planning to schedule a meeting. I will NOT schedule a meeting for the next two business days following your email.
     - In your initial email you should **suggest three time slots** that would work for you and I'll try to pick one.
  4. Please do not send me questions via email.

- **Regrading**

  You may ask for a regrade within one week after the exam was distributed if you think your exam was graded incorrectly. If you ask for a regrade, you must email me explaining what specifically you view as having been graded incorrectly. I will then regrade your whole exam. So your score could go up or down.

- **Academic Integrity**

  Academic dishonesty in assignments, examinations, or other academic performance is prohibited and considered a violation of the student conduct. All students are responsible for knowing and adhering to the academic integrity policy of the university at: CODE OF STUDENT ACADEMIC INTEGRITY

- **Some Tips and Warnings:**

  1. Econometrics is a very demanding course even though I try to keep the coverage to minimal. So some students slack off. The only way to learn it is to keep going over it again and again, work through the problems in the book and problem sets, and think about what you are doing at each step when you solve problems.
  2. The course will progress by building on previous parts so let me urge you to read as much of the material as possible early on in the course. You will find this will help you develop a perspective on the course material and lead to a better understanding of econometrics.
  3. Do not wait until after I have lectured on a topic to read the material, instead work on it yourself first. Come to class prepared! I will integrate the material as we go along, but you will be ahead of the game if you make extended efforts to learn and integrate it yourself.
  4. The emphasis in this class is on developing your ability to apply analytical techniques and on your understanding of fundamental concepts. Exams will emphasize this. They will assume you have a complete understanding of the lectures, text and problem sets, and will ask you to apply what you have learned to new circumstances.
  5. If you are having problems with the material, please seek out help early. If you are unable to make my scheduled office hours, please email me noting your availability and we will set up an alternative time to meet.

6 Outline of the Course Content (Tentative)

# of **Lectures**	**Topics**	**Readings**
2	Introduction and Review of probability and statistics	**SW 1-2-3**
2	Introduction to `R`	**LS**
	Test 1 - January 30	
3	Linear Regression with One Variable	**SW 4**
2	Hypothesis Tests and Conf. Int. with a Single Regressor	**SW 5**
	Test 2 - February 27	
3	Linear Regression with Multiple Variables	**SW 6**
2	Hypothesis Tests and Conf. Int. in Multiple Regression	**SW 7**
2	Nonlinear regression	**SW 8**
2	Assessing Studies Based on Multiple Regression	**SW 9**
	Test 3 - April 3	
1	Instrumental variables regression	**SW 12**
2	Regression with a Binary Dependent Variable	**SW 11**
	Test 4 (Final Exam) - TBA	

7 Statements on Diversity and Disability Accommodations

Belk College statement on diversity
The Belk College of Business strives to create an inclusive academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

University's statement on disability accommodations
UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please provide a letter of accommodation from Disability Services early in the semester. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office in Fretwell 230.