UC 11828 12F

# CBM003 ADD/CHANGE FORM

| ☒ Undergraduate Council<br>☐ New Course ☒ Course Change<br>Core Category: Math/Reason Effective Fall 2014 | or | Graduate/Professional Studies Council<br>☐ New Course ☐ Course Change<br>Effective Fall 2013 |
|---|---|---|

1. Department: ECON College: CLASS
2. Faculty Contact Person: Ruxandra Boul Telephone: 33836 Email: rprodan@uh.edu
3. Course Information on New/Revised course:
   - Instructional Area / Course Number / Long Course Title:
     ECON / 2370 / Introduction to Statistics and Data Analysis

     RECEIVED OCT 12 2012
   - Instructional Area / Course Number / Short Course Title (30 characters max.)
     ECON / 2370 / Intro Stats and Data Analysis
   - SCH: 3.00 Level: SO CIP Code: 45.0603 Lect Hrs: 3 Lab Hrs: 0
4. Justification for adding/changing course: **To meet core curriculum requirements**
5. Was the proposed/revised course previously offered as a special topics course? ☐ Yes ☒ No
   If Yes, please complete:
   - Instructional Area / Course Number / Long Course Title:
     ____ / ____ / _____
   - Course ID: _____ Effective Date (currently active row): _____
6. Authorized Degree Program(s): BS, BA
   - Does this course affect major/minor requirements in the College/Department? ☐ Yes ☒ No
   - Does this course affect major/minor requirements in other Colleges/Departments? ☐ Yes ☒ No
   - Can the course be repeated for credit? ☐ Yes ☒ No (if yes, include in course description)
7. Grade Option: Letter (A, B, C …) Instruction Type: lecture ONLY (Note: Lect/Lab info. must match item 3, above.)
8. If this form involves a change to an existing course, please obtain the following information from the course inventory: Instructional Area / Course Number / Long Course Title
   ECON / 2370 / Intro Stats and Data Analysis
   - Course ID: 19242 Effective Date (currently active row): 08/23/2004
9. Proposed Catalog Description: (If there are no prerequisites, type in "none".)
   Cr: 3. (3-0). Prerequisites: Completion of MATH 1310 or equivalent or consent of instructor
   Description (30 words max.): Introduction to descriptive statistics, probability models, statistical inference, and hypothesis testing. Introduction to real world statistics for any behavioral science student, including economics, demography, political science or psychology.
10. Dean's Signature: _____ Date: 10/8/12

    Print/Type Name: Sarah Fishman

# REQUEST FOR COURSES IN THE CORE CURRICULUM

Originating Department or College: Department of Economics

Person Making Request: Ruxandra Boul Telephone: 7137433836

Email: rprodan@uh.edu

Dean's Signature: Date: 09/05/2012

Course Number and Title: Econ 2370 Introduction to Statistics and Data Analysis

Please attach in separate documents:

X Completed CBM003 Add/Change Form with Catalog Description

X Syllabus

List the student learning outcomes for the course (Statements of what students will know and be able to do as a result of taking this course. See appended hints for constructing these statements):

ECON 2370 is an introductory course on probability theory, statistics and data analysis, with particular focus on applications in economics, finance and business and hands-on practice in Excel 2010. The goal of the course is threefold:

1)Students will learn fundamental concepts and techniques for statistics, including probabilities, frequencies, average and standard deviation, and probability distributions such as the normal and standard normal

2)Students will learn to use the appropriate statistical tools in different applications, such as knowing when to construct a histogram, when to present a contingency table, and when to use the normal distribution to represent sample data

3)Students will get ample opportunities to practice applying concepts to actual data through the use of Excel. They'll also learn how to interpret statistical results when working on real-world problems.

Component Area for which the course is being proposed (check one):

☐ Communication

X Mathematics

☐ Language, Philosophy, & Culture

☐ Creative Arts

☐ Life & Physical Sciences

☐ American History

☐ Government/Political Science

☐ Social & Behavioral Science

☐ Component Area Option

Competency areas addressed by the course (refer to appended chart for competencies that are required and optional in each component area):

| | |
|---|---|
| x Critical Thinking | ☐ Teamwork |
| x Communication Skills | ☐ Social Responsibility |
| x Empirical & Quantitative Skills | ☐ Personal Responsibility |

Because we will be assessing student learning outcomes across multiple core courses, assessments assigned in your course must include assessments of the core competencies. For each competency checked above, indicated the specific course assignment(s) which, when completed by students, will provide evidence of the competency. Provide detailed information, such as copies of the paper or project assignment, copies of individual test items, etc. A single assignment may be used to provide data for multiple competencies.

Critical Thinking:
Students will write an essay to answer several questions. For this assignment, students should be able to use economic theory, critical thinking, communication skills and empirical and quantitative skills. In order to evaluate their critical thinking competency we will measure the following:

1. The student's ability to use economic theory in order to assess the appropriate economic factors.
2. The student's ability to interpret results of quantitative information.

Rubric:

| Weak | 1 | 2 | 3 | 4 | 5 | Strong |
|---|---|---|---|---|---|---|

Objective 1:

Strong: Is able to use economic theory in order to assess the appropriate economic factors.

Weak: Does not identify the appropriate economic factors.

Objective 2:

Strong: Correctly identifies and interprets important results of analysis; conclusions and supporting discussions are correct and relevant.

Weak: No evaluation provided or consistently provides incorrect or irrelevant conclusions/interpretations.

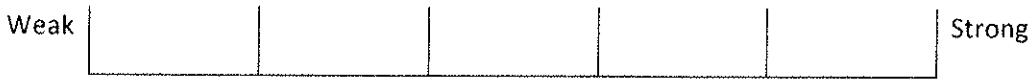
Example of assignment:
A politician wants to know the empirical relationship between the price of crude oil and economic forces and has enlisted your help in coming up with a good statistical model. Using your knowledge of economics and regression, write an essay to answer the following questions:

1. Which economic factors should be included in your model? Discuss at least five and be sure to tell us why they are relevant.
2. For each economic factor, describe the variable that measures the factor.
3. Write out the regression model using the factor variables.
4. Describe how you would load the data and run the model using OLS in Excel 2010.
5. Discuss the meanings of the coefficient estimates, predicting the sign of each coefficient as you go along. Give some hypothetical examples where you can (e.g., "The sign of variable *xx* is 3.52, meaning that ...").
6. Discuss how you would use the *t*-stats and *p*-values, as well as the regression *R*^2, to assess the strength of your statistical model.

Communication Skills:

In the same essay as above, students will demonstrate their ability to communicate effectively.We will measure the following:

The student's demonstration of organized thought and ability to communicate clearly through writing.




Strong: Presents main points in a clear and easy to follow sequence; does not contain unnecessary duplication of ideas or information; does not contain errors of punctuation, grammar, spelling, etc.

Weak: Presentation is unclear and disorganized; contains unnecessary duplication of ideas or information; contains errors of punctuation, grammar, spelling, etc.

Empirical & Quantitative Skills:

In the same essay as above, students will demonstrate their empirical and quantitative competency. We will measure the following:

1. The student's ability to formulate a statistical model.
2. The student's ability to analyze quantitative data using methods and tools used by statisticians.

Rubric:

| Weak | 1 | 2 | 3 | 4 | 5 | Strong |
|---|---|---|---|---|---|---|

Objective 1:

Strong: The statistical model is correct and the student is able to asses its strength using statistical measures.

Weak: The statistical model is incorrect and/or has missing variables.

Objective 2

Strong: Shows that is able to work with and analyze quantitative data using statistical methods.

Weak: Is not able to work with data and use statistical methods to analyze quantitative data.

Teamwork:
Click here to enter text.

Social Responsibility:
Click here to enter text.

Personal Responsibility:
Click here to enter text.

Will the syllabus vary across multiple section of the course? ☐ Yes x No
If yes, list the assignments that will be constant across sections:
Click here to enter text.

Inclusion in the core is contingent upon the course being offered and taught at least once every other academic year. Courses will be reviewed for renewal every 5 years.

The department understands that instructors will be expected to provide student work and to participate in university-wide assessments of student work. This could include, but may not be limited to, designing instruments such as rubrics, and scoring work by students in this or other courses. In addition, instructors of core courses may be asked to include brief assessment activities in their course.

Dept. Signature: Tray Bennefield for David

PRELIMINARY DRAFT

*E-Mail Contact:*
**profjiu@live.com** (preferred)
hjiu@uh.edu

*Resources Website:*
http://bit.ly/econ2370web

# ECON 2370: Introduction to Statistics and Data Analysis

Dept. of Economics, CLASS, U. of Houston
Fall 2014 Sample

| | |
|---|---|
| Professor: | H. Brett Jiu (E-mail: ProfJiu@live.com) |
| Lectures: | Tue & Thur, 10:00 – 11:30 (#12894) or 11:30 – 1:00 (#12893) |
| Office hours: | Tue & Thur, 9:00 – 9:45, or by appointment (office: McElhinney 216) |
| TA: | Mr. Emiliano Luttini, office hours: Wed, 10 – 11:30 (office: McElhinney 248) |

**Pre-requite:** MATH 1310 or equivalent – ECON 2370 is a highly mathematical course!

***Description***

ECON 2370 is an introductory course on probability theory, statistics and data analysis, with particular focus on applications in economics, finance and business and hands-on practice in Excel 2010. The goal of the course is threefold:

1) to introduce students to the fundamental concepts of statistical analysis,
2) to prepare students for a next course in econometrics (statistics applied specifically to economics and finance), and
3) to allow students to carry out common statistical analysis in Excel 2010.

Please note that Excel is an integrated part of this course.

This course will cover the following broad topics:

- Probability theory: events, simple probability, joint probability, conditional probability
- Random variables and statistical distributions: uniform, normal, pdf, cdf
- Descriptive statistics: mean, standard deviation, median, correlation
- Statistical inference and hypothesis testing
- Basic regression models: OLS

You do not need to have prior knowledge of probability theory or statistics to enroll in this course; however, a first college-level mathematics course, such as **MATH 1310**, is pre-required. In the past students who had trouble with concepts such as functions found this course to be extra-challenging.

In addition to introducing the concepts and models of probability and statistics, students will learn hands-on statistical analysis in Microsoft Excel 2010 (which has gained enormous popularity for basic

statistical analysis due to its functionality and affordability), from analyzing data to charting. **You must have access to Excel 2010 or 2007** to take this course. (See Required Materials below for details.)

I'd like to emphasize the important fact that my teaching style focuses on interactive learning, i.e., students should come to lectures to both listen and ask questions. We do not have an official textbook for the concepts (the required textbook given below is for supplementary learning), so it's vitally important that you attend lectures *and* study the lecture notes I post online. Coming to office hours (mine or the TAs') is also highly encouraged. Tutoring service for this course is available at the student learning center as well as in the econ department.

***Required Materials***

**Book**

The *required* book for this course is *Statistical Analysis: Microsoft Excel 2010,* by C. Carlberg and from Que Publishing. You can get details about the book here: http://amzn.to/econ2370. You can purchase a copy from the campus bookstore or from any source you prefer, or even an e-edition (e.g., Nook, Kindle, Sony). The campus bookstore also offers a rent option for $19.60. You can also borrow a copy from a library. Please acquire the textbook no later than the third week of the semester.

Please note that the required textbook is actually a supplement to my lectures and lecture notes. It's not the best way to learn statistics; instead, it's mean to teach you Excel 2010 skills after you're familiar with basic statistics concepts.

**Lecture Notes**

I will be lecturing from my own lecture notes. The notes will be posted to Blackboard Vista as well as the course's cloud drive at SkyDrive (http://bit.ly/econ2370sky) after each lecture. You should download and read through the lecture notes carefully. The notes are especially important for understanding the concepts in statistics.

If you think you need more help from a traditional textbook, you can borrow or use any statistics textbooks – preferably one geared towards economics. (See Course Outline later for topics covered in this course.) Most students who took this course in the past found it most beneficial to read the lecture notes in addition to attending all lectures. You're also encouraged to come to office hours.

**Excel 2010**

As noted before, you **must** have access to Excel 2010 (or Excel 2007 – but I highly recommend Excel 2010). Versions of Excel for Windows prior to 2007 are not recommended, and you cannot use Excel for the MacOS due to critical missing features in those versions.

It's very important that you have your own copy of Excel 2010. Not only do most homework assignments require Excel 2010, but part of the final exam requires Excel 2010 (see Grading below for details)!

The following are the options for obtaining Excel 2010 if you do not have it already:

1. If you have a Windows computer: easy – just purchase the Office 2010 suite (professional edition) from Cougar Byte for only $14 (please install the 32-bit version). *Please do NOT pirate software or use pirated software; it's a federal crime!*
2. If you have a non-Windows computer: you can either run Windows 7 ($19 from Cougar Byte) in emulation (e.g., via the freeware VirtualBox from virtualbox.org) and then buy and install Excel 2010 (see #1 above), or use a campus computer that already has Excel 2010, or buy (or borrow) a Windows computer and Install Office 2010. (Remember, you'll need Excel 2010 for part of the final exam.)
3. If you do not own a computer at all: you can either purchase a Windows computer (even a $300 or less netbook will run Excel 2010 fine) plus Office 2010 (see #1 above), or borrow one that has Excel 2010, or use a campus computer – computers in most PC labs around campus (econ dept, Anderson library, etc.) already have Excel 2010 installed.[1] (Remember, though, you'll need Excel 2010 for part of the final exam.)

I've set up a resources page for the course at http://bit.ly/econ2370web.

***Grading***

- Class participation: 10%
- Homework submission: 10%
- Homework performance: 20%
- In-class pop quizzes (3x5%): 15%
- Midterm: 15%
- Excel final: 10%
- Written final: 20%

Notes:

(1) Homework Assignments:

[1] Most new Windows PCs these days come with a free version of Office 2010 called "Office 2010 Starter Edition." Because this free version lacks some of the statistical tools we'll need, you must upgrade to the full version of Office 2010 ("Professional Edition") for $14 from the Cougar Byte campus store. Also, the free web edition of Excel ("Excel Web App") does not have the necessary statistical tools, either.

a. There will be 10 required homework assignments and one optional extra-credit assignment.
b. You lose 1 point of the course grade for each required assignment you fail to complete.
c. Late homework will *not* be accepted, out of fairness to all students.
d. **If you fail to turn in 60% of the required homework assignments, you will automatically receive an F for the course.**
e. *All* homework grades will be counted; none will be dropped.
f. I will give out one extra-credit assignment which will be optional, later in the semester.
g. All assignments are to submitted online to either Blackboard Vista or by e-mail to ProfJiu@live.com (please include "ECON 2370" in your e-mail subject line, to avoid your assignment being sent to the junk folder), before the deadline.
h. Assignment solutions will be discussed in a following lecture; they will not be posted.

(2) Pop quizzes:

a. There will be three (3) short written quizzes during the semester (~15 minutes each).
b. The quiz days will *not* be announced in advance.
c. The quizzes will be completely closed-book.
d. There will be absolutely no make-up for the quizzes.

(3) Midterm:

a. The midterm will be completely closed-book.
b. You do not need to – in fact, you cannot – use a computer for the midterm.
c. **If you fail to show up for the midterm and you fail to turn in 40% of the required homework assignments, you will automatically receive an F for the course.**
d. If you have to miss the midterm due to reasons allowed by the University (such as a serious illness or collegiate athletics), you can take a makeup provided you show legitimate written proof backing up your reason (e.g., a signed physician's note, a signed official letter).

(4) Final exam:

a. The final exam will be closed-book except for one single letter-sized cheat sheet.
b. You do not need to – in fact, you cannot – bring a computer to the final.
c. The final exam will be cumulative of all materials covered in the course, with emphasis on the materials after the second midterm.
d. **If you fail to show up for the final exam and also if you fail to show up for the midterm or fail to submit 20% of the required homework assignments, you will automatically receive an F for the course.**
e. Due to seating capacity and the absolute need to comply with fire code, all students must take the final exam on their section's scheduled date. No student will be allowed to take the final exam on the other section's date.

f. Makeup for the final will *only* be given for University-approved reasons, such as medical emergency or University-approved athletic activity. I'm not authorized to accept any other reasons (e.g., "my alarm clock didn't work"), period.

(5) Remember: out of fairness to all students enrolled in the course, I cannot make exceptions when it comes to grading. Please be responsible for your own studies and attendance.

Your course letter grade will be determined from the overall class curve and in accordance with University guidelines; the letter grade is assigned after taking into account your performance on the optional extra-credit assignment. Exceptions: (i) A score of 95% or higher will automatically result in an A, the highest letter grade; (ii) **a score of 30% or lower will automatically lead to an F**; (iii) see notes above (1d, 3b, and 4c) for other conditions whereby a student can end up getting an F regardless of course score.

Once carefully assigned, double-checked and uploaded to PeopleSoft, I will not change your course grade. E-mails begging for grade upgrades will be automatically ignored. *Please maintain your dignity by not begging for grades.* You are encouraged to discuss with me your progress prior to the final exam, or, preferably, prior to the last drop day on Nov. 2. Please note that due to the curving nature of the course grade, I will not be able to give course grade estimates prior to uploading the grades to PeopleSoft at the end of the semester.

I hope you will enjoy the course and learn something truly useful! See you in class!

***Miscellaneous***

When sending e-mail to your instructor at ProfJiu@live.com, whether it's a question or homework submission, please include the text "ECON 2370" in the Subject line of your message, so your message won't be treated as junk mail.

***Tentative Schedule*** *(likely to change as the semester progresses)*

Below is the tentative lecture schedule, subject to change without notice.

| | |
|---|---|
| Aug. 28 | Introduction to course |
| Aug. 30 | Review of college algebra, introduction to Excel 2010 (attendance optional) |
| Sep. 4 | Probabilities: events, simple events, sample space |
| Sep. 6 | Probabilities: types, joint events |
| Sep. 11 | Probabilities: combinatorics (counting rules) |
| *(Sep. 12* | *Official Reporting Day [ORD] – last day to drop course without receiving a grade)* |
| Sep. 13 | Excel Lab: frequencies, contingency tables (read Carlberg, Chaps. 1 and 5) |
| Sep. 18 | Probabilities: conditional probabilities, independence |
| Sep. 20 | Introduction to random variables and probability distributions |

| | |
|---|---|
| Sep. 25 | Discrete random variables and probability distributions |
| Sep. 27 | Continuous random variables and probability distributions |
| Oct. 2 | Excel Lab: central tendency, dispersion (read Carlberg, Chaps. 2, 3 and 4 [up to p.95]) |
| Oct. 4 | Normal probability distribution (read Carlberg, Chap. 7) |
| Oct. 9 | Descriptive statistics: population and sample statistics |
| Oct. 11 | Review for midterm |
| Oct. 16 | **Midterm exam** (closed-book, computer not needed) |
| Oct. 18 | Covariances and correlations (read Carlberg, Chap. 4) |
| Oct. 23 | Graphing data in Excel 2010 |
| Oct. 25 | Confidence intervals, part 1 |
| Oct. 30 | Confidence intervals, part 2 |
| Nov. 1 | Hypothesis testing, part 1 (read Carlberg, Chap. 8) |
| *(Nov. 2* | *Last day to drop course and receive a "W" grade)* |
| Nov. 6 | Hypothesis testing, part 2 |
| Nov. 8 | ??? |
| Nov. 13 | ??? |
| Nov. 15 | ??? |
| Nov. 20 | Linear regressions: OLS on single independent variable, part 1 |
| *(Nov. 22* | *Thanksgiving break)* |
| Nov. 27 | Linear regressions: OLS on single independent variable, part 2 |
| Nov. 29 | Linear regressions: OLS in Excel 2010 |
| Dec. 4 | **Excel test** (in **AH 101** Electronic Testing Center, closed-book) |
| Dec. 8 | Course review (attendance optional) |

*Written Final Exam:*

**Dec. 13 (Thur.), 11-2** **Final exam for the 11:30-1 section** (closed-book but one cheat sheet allowed)
**Dec. 18 (Tues.), 11-2** **Final exam for the 10-11:30 section** (closed-book but one cheat sheet allowed)
Note: the final exam covers everything taught in the course, but with emphasis on materials after the midterm exam. **You must take the final exam at *your* own section's scheduled day and time.**

Official UH final exam schedule link:
http://www.uh.edu/academics/courses-enrollment/final-exam-schedules/#Fall

*Syllabus last updated 2012-10-05*