Florida Institute of Technology

ADDING A NEW COURSE TO THE CURRICULUM

This course is available for student registration only after the approval process has been completed.

SUBJECT EST COURSE NO. 2703 CREDIT HOURS 3 TERM TO BE ADDED TO THE FILE Spring 2008
Alpha Prefix (e.g., CSE) Number Choice (e.g., 1301)

CLASS HOURS 45 LECTURE HOURS 45 LAB HOURS CONTACT HOURS (CEU ONLY)

DEPARTMENT University College SCHEDULE TYPE virtual classroom
(e.g., Computer Sciences) (e.g., Lecture, Lab or Special Project)

- COLLEGE OF AERONAUTICS-23
- COLLEGE OF PSYCHOLOGY AND LIBERAL ARTS-25
- COLLEGE OF BUSINESS-24
- COLLEGE OF SCIENCE-26
- COLLEGE OF ENGINEERING-01
- UNIVERSITY COLLEGE EXTENDED STUDIES-27

COMPUTER TITLE Restricted to 25 characters, including spaces Statistics

CATALOG TITLE Statistics

CATALOG DESCRIPTION OF COURSE Limited to 350 characters, including spaces

STATISTICS: An elementary statistics course with emphasis on mathematical concepts. Topics include measures of central tendency and spread, probability, binomial, normal, and t distributions, statistical inference, and linear regression and correlation.

In addition, you may attach a course syllabus and/or more detailed description.

RESTRICTIONS: Prerequisite MTH 1000 or higher Corequisite Course Number

COREQUISITE Course Number

GRADES TO BE ISSUED
- A, B, C, D, F
- A, B, C, D, F, CEU
- CEU
- S, U
- P, F
- Other

ADDITIONAL RESTRICTION
(e.g., Major, Class Level, Department Head Approval)

If this course replaces a course currently offered in BANNER, please indicate old course information

SUBJECT Alpha Prefix (e.g., CSE) COURSE NO. (e.g., 1301)

APPROVALS: Upon completion of appropriate department approvals, submit form to Chair, Graduate Council, or Chair, Undergraduate Curriculum Committee for approval below and forward to Catalog Director.

[Signatures]

Originator Date Chair, Graduate Council Date

Dean or Program Chair

Date

Chair, Undergraduate Curriculum Committee

Date

CATALOG DIRECTOR

These changes/additions have been made for the University/Extended Studies Catalog and entered into the BANNER term named above.

Catalog Director Date

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SCARIES Operator Init Date

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RG-271-006
EST 2703: Statistics

Course Description

An elementary statistics course with emphasis on mathematical concepts. Topics include measures of central tendency and spread, probability, binomial, normal, and t distributions, statistical inference, and linear regression and correlation.

Course Objectives

Analysts and economic policy-makers use statistical tools to summarize, present and evaluate qualitative and quantitative information, with the goal of solving problems and making informed decisions. They do so because statistics offers a meaningful way to draw useful conclusions from real world behavioral observations. This course provides lots of hands-on experience applying statistical tools to problem-solving situations. By the end of this course you should be able to 1) present and interpret statistical data using charts and graphs; 2) identify and work with specific probability and sampling distributions 3) formulate and test hypotheses; and 4) test hypotheses and predict outcomes using regression analysis.

Learning Objectives

- Enhance Critical Thinking Skills
  - Ability to interpret statistical output
  - Ability to use statistical analysis to make business decisions
  - Ability to match appropriate statistical tool with problem
- Enhance Technical Skills
  - Working with Secondary Data Sources
  - Generating Statistical Output using Excel and/or SPSS
- Foster Ethical Practices
  - Detecting Fraud, Absenteeism and Discrimination
  - Abuses: data mining, ignoring negative information, fitting results to a pre-determined conclusion

Course Resources and Prerequisites

- **Blackboard**: enroll at [http://fit.blackboard.com](http://fit.blackboard.com); EST 2703: Statistics. You will find announcements, answer keys, and PowerPoint slides on Blackboard.
- **Calculator**: nothing fancy (Texas Instruments TI-30X IIS); bring to each class
- **Excel and/or SPSS**:
- **Prerequisite**: MTH 1000 or higher
Grading and Assessment

- Module Exams (3) 50% (two high scores: 20% each; low score: 10%)
- Module 4 Exam 30%
- Mini-tests (5) 20% (drop low score)
- Intangibles 2%

Examinations and Mini-tests

- Short answer exams and mini-tests will be given periodically throughout the semester. Mini-tests will last for 30 minutes and should be used as a device to identify concepts that require additional study and to correct minor mistakes in logic and/or process. The best way to study for exams and mini-tests is to work the assigned problems from the textbook.
- A student may be given a make-up exam provided he/she notifies the instructor prior to the test date (for university sponsored events notification must occur one month prior to the exam) and at the appropriate time offers the instructor a signed medical notice. The exam must be taken within a time frame defined by the instructor.
- A missed exam or mini-test, without a verifiable administrative or medical excuse, will be scored as a zero in my grade book. There will be NO MAKE-UP for a missed mini-test. In order to avoid penalizing someone who fails to attend a mini-test because of a university sponsored event, medical emergency or unforeseen special situation I will drop your lowest quiz score.
- The public posting of grades either by student name, institutional student number or social security number without the student’s written permission is a violation of the Federal Family Educational Rights and Privacy Act. Further, student grades may not be forwarded via e-mail (even in response to the student’s request).

Intangibles Grade

The "intangibles" category effectively adds bonus points to your total score, and is intended to cultivate desirable habits and traits employers expect in the work place. Students can earn up to 100 points, which will then be converted using a 2% weight. You can earn points in the following categories.

- Punctuality and Virtual Class-room Decorum (up to 20 points, subjective)
- Active Participation during problem solving exercises (up to 40 points; subjective)

Attendance

Unexcused absences will be recorded in my grade book. A student who exceeds THREE unexcused absences will automatically receive zero for the intangibles grade. An excused absence will be granted for University sponsored events, medical emergencies and special situations as long as you can provide verifiable documented evidence to support your claim. Students who attend class to write a mini-test but then skip the remainder of the class will be marked absent.

ADA Accommodations

Please contact Rodney Bowers, Director, Academic Support Center, 321-674-7110, rbowers@fit.edu with any specific ADA accommodations you may require as you work to meet the course requirements.
Course Outline
(Subject to revision at the discretion of the instructor)

Module 1: Descriptive Statistics

1. **Displaying Distributions with Graphs**
   **Reading:** section 1.1
   a. Histograms
      i. shape, center, spread, outliers
      ii. interpreting histograms
      iii. constructing a histogram from scratch
   b. Creating Histograms and Frequency Distributions Using Excel
   c. Other Charts
      i. bar graphs and pie charts
      ii. time plots

2. **Describing Distributions with Numbers**
   **Reading:** section 1.2 and 1.3
   a. Describing the Center and Spread
      i. Mean and standard deviation
      ii. Median, range, inter-quartile range
   b. **Mini-Test 1**
   c. Describing the Position and Distance of an Observation
      i. Percentile
      ii. Z-score
   d. Shape of a Distribution
      i. Normal Distribution
      ii. Histogram
      iii. Box-Plot

3. **Examining Relationships: Numerical Data**
   **Reading:** section 2.1, 2.2, 2.3, 2.4
   a. form, direction, strength
      i. scatterplots
      ii. correlation coefficient and $R^2$
   b. prediction
      i. regression line
      ii. outliers, influential observations
   c. cautions about correlation and regression

Module 2: Probability and Sampling Distributions

4. **Preliminary Concepts**
   **Reading:** section 3.1, 4.1, and 2.5
   a. **Mini-Test 2**
   b. The idea of probability (coin toss simulation)
   c. Simple Random Sampling
   d. Contingency Tables – a first look
5. General Probability Rules  
Reading: 4.2, 5.1 and 5.4
   
   a. Module 1 Examination  
   b. General Probability Rules  
   c. Conditional Probability and Probability Trees  

6. Introduction to Sampling Distributions  
Reading: section 3.3 and 4.4,  
   a. The idea of sampling distributions  
   b. The sampling distribution of a sample mean  

7. Working with Core Probability Distributions  
Reading: section 5.2 and 5.3  
   
   a. Binomial distribution  
   b. Poisson Distribution  

Module 3: Basic Inferential Techniques  

8. Confidence Intervals  
Reading: section 6.1  
   
   a. Mini-Test 3  
   b. Interval estimates in general  
      i. Replication and confidence  
      ii. Point Estimate  
      iii. Margin of Error  
   c. Interval estimates for a population mean  
   d. Practice problems  

9. An Introduction to Tests of Significance  
Reading: section 6.2, 6.3  
   
   a. Module 2 Examination  
   b. Research hypothesis and Null hypothesis  
   c. Statistical evidence using test-statistics  
   d. Assessing statistical significance using P-values  
   e. Statistical significance vs. practical significance  

10. Inference for the Mean: One Population  
Reading: section 7.1 and 6.4  
   
   a. One-sided alternative  
   b. Two-sided alternative  
   c. Problems  
   d. Power
11. Inference for the Proportion: One Population
   Reading: section 8.1
      a. Mini-Test 4
      b. One-sided alternatives
      c. Two-sided alternatives
      d. Problems

Module 4: Advanced Inferential Techniques

12. Comparative Experiments
   Reading: section 3.2
      a. Module 3 Examination
      b. Comparative Design Experiments
         i. Completely randomized experiment
         ii. Matched pair design
         iii. Block design

13. Multiple Population Models
    Reading: section 9.1, 9.2, and online material
      a. Chi-Square Tests
      b. One-Way ANOVA

14. Regression Analysis
    Reading: 2.3, 10.1, 11.1 and 11.2
      a. Mini-Test 5
      b. Regression Review
      c. Inference about the regression slope
      d. Multiple Regression
         i. Regression equation and slope coefficient interpretation
         ii. Regression equation and prediction
         iii. Inference about the coefficient values

15. Model Building and Abuses in Statistics
    Reading: section 11.3 and on-line material
      a. Model Building with Multiple Regression
      b. Abuses in Statistics

16. Module 4 Examination