

DANIELS COLLEGE OF BUSINESS MISSION STATEMENT

The mission of the Daniels College of Business is to foster Enlightened Practice, Professional Achievement and a Commitment to Community among those engaged in management and the business professions.

As an institution that emphasizes the scholarship of teaching, our mission is achieved through programs that recognize the diversity of a global economy and embrace:

- Knowledge and technical ability
- Interpersonal skills and intercultural understanding
- Ethically based leadership and social responsibility

Our mission is represented through the icon:



Syllabus – STAT 4610

Foundations of Statistics

Welcome to the Course !

Daniels College of Business Code of Academic Integrity –

http://www.daniels.du.edu/pdf/code_of_academic_integrity.pdf

University of Denver Honor Code - <http://www.du.edu/ccs/honorcode.html>

Official Communications

The standard method of communicating official information from the Daniels College of Business to its students is the University's electronic mail (e-mail) system. Private e-mail accounts will not be accepted as appropriate e-mail addresses. Students may set up their University e-mail account so that messages are forwarded to another account automatically. Instructions about forwarding messages are available on the University website at

<http://www.du.edu/uts/policies/index.html>.

Students with Disabilities

If you have a disability protected under the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act and need to request accommodations, please speak with me privately and schedule an appointment with the Disability Services Program (DSP). DSP is located in *The Center* below the bookstore in Driscoll South – phone 303-871-2455.

Performance Assessment

The Daniels College of Business may use assessment tools in this course and other courses for evaluation. Educational Assessment is defined as the systematic collection, interpretation, and use of information about student characteristics, educational environments, learning outcomes and client satisfaction to improve program effectiveness, student performance and professional success.

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Overall Course Objectives

Develop an understanding of the basic concepts of probability and statistics, and how they relate to managerial type problems and decision making. Develop experience performing and interpreting standard data analysis methodologies. Obtain familiarity with a statistical software package.

Textbook

None required

Evaluation

Test I : 15% of course grade

Test II : 15% of course grade

Test III : 15% of course grade

Project : 40% of course grade

Class participation : 15% of course grade

All tests are open book and open notes (no computers, but calculators OK).

Beyond Grey Pinstripes

The course will consider ethical considerations in probability and statistics. We look at the codes of conduct of the major professional societies in statistics, and we will look at examples from the biopharmaceutical industry.

Topics and Course Content

Overview of the course

Data types [text: pages 8-13]

Matching data to analysis methodology (*handout on Blackboard*)

Introduction to Minitab

Data presentations (*Minitab handout on Blackboard*) [text: Chapters 2, 3, & 4]

Statistical inference toolbox [text: Chapters 9 & 10]

- Estimation
- Confidence intervals
- Hypothesis testing

Two-sample analyses [text: Chapter 11]

- Paired (*Minitab handout on Blackboard*)
- Unpaired (*Minitab handout on Blackboard*)

Simple linear regression (*Minitab handout on Blackboard*)

Multiple linear regression (*Minitab handout on Blackboard*) [text: Chapters 13 & 14]

Analysis of variance (*Minitab handout on Blackboard*) [text: Chapter 12]

Categorical data analysis [text: Chapter 17]

- inferences on population proportions
- goodness of fit tests

Presentation: “Uses and Abuses of Statistics”

Overlap of statistics with other courses (*handout on Blackboard*)

Discussion and feedback on the course

Course surveys

Course evaluations

Project proposals

Project presentations

Learning Objectives

Test 1

Data types and matching data to analysis methodology

- Identifying whether data is continuous or categorical
- Knowing when a two-sample analysis is appropriate
- Knowing when a regression model is appropriate
- Knowing when an analysis of variance is appropriate

Data overview

- Ability to appropriately use boxplots, dotplots, histograms, scatterplots
- Ability to construct and interpret summary statistics

Statistics Toolbox

- Understanding the roles of estimation, confidence intervals, and hypothesis testing

Two-sample analysis

- Knowing when a two-sample analysis is appropriate
- Ability to distinguish between paired and independent two-sample designs
- Understanding the basic elements of experimental design such as blind designs and placebos
- Ability to use the statistics toolbox for a two-sample analysis

Test 2

Regression analysis

- Knowing when a regression analysis is appropriate
- Interpretation of a regression model
- Understanding of model building
- Ability to use a software package to run a regression analysis
- Use of automatic forward and backward selection procedures
- Understanding of residual analysis
- Understanding of outliers and high leverage points
- Understanding of association and causality

Test 3

Analysis of variance

- Knowing when an analysis of variance is appropriate
- Interpretation of an analysis of variance model
- Ability to perform basic experimental designs
- Ability to use a software package to run an analysis of variance
- Appropriate use of pairwise comparisons

Categorical data analysis

- Ability to perform inferences on population proportions
- Goodness of fit tests

Project

- Ability to use a statistical software package to perform a statistical analysis
- Ability to recognize the appropriate statistical tools for a given problem
- Develop skills for writing up and disseminating the results and conclusions of a statistical analysis

Projects

The purpose of the project is to demonstrate that you can perform a data analysis using a computer package such as Minitab, and that you can properly write up and disseminate the results and conclusions of your analysis.

You will need to find an appropriate data set for your project. This can be data obtained from an existing source, or data that you collect yourself by running an experiment. Don't use a "pre-packaged" data set obtained from a textbook or from another instructor's website. The data can be on any topic, but the relevance and interest of the project is part of the grade.

You can do an analysis using one (or more) of these three methodologies:

- two-sample analysis
- regression analysis
- analysis of variance
- contingency table analysis

Use a statistical software package to perform an analysis of your data set. This should include the generation of appropriate summary statistics and graphical representations. There should be at least one hypothesis test.

Deliverables:

(i) A 10-minute proposal to the class where you describe your data set together with the analysis you intend to do. This is after you have collected the data but before you perform your analysis. Your proposal should describe:

- your data
- how you obtained your data
- which type of analysis you will perform (two-sample, regression, or analysis of variance)
- what hypothesis you are interested in testing

Your proposal should also be posted on Blackboard.

(ii) A 20-minute final presentation to the class where you describe your analysis, discuss any issues you came across, and explain your conclusions and what you learned from the project. This presentation should include:

- graphical representations of your data
- summary statistics of your data
- Minitab output for the analysis you performed
- interpretation, summary, and conclusions

(iii) A hard copy of your final presentation.

Class participation

Your education from the class comes from the learning experience of doing your own project, plus your interactions with the projects of your classmates. Helpful discussions of your classmates' proposals and presentations are encouraged.

Grading

Your grade will be based upon how interesting your data set is, how accurate and complete your analysis is, and how well you describe your work in your presentation. Grades are also based upon your participation in the discussions of your classmates' projects.