

Rutgers Business School: Graduate Programs Newark and New Brunswick
22:960:575 & 563 DATA MODELS and DECISIONS (3 Credits)
2009-2010

Revised: 11/06/08 Syllabus.DM.waiver.doc

NOTES FOR TAKING THE EXAM:

[1] A plain, 4-function calculator can be used, but not palm pilot or similar PDA, nor any graphing calculator with text capability - if the calculator has an "alpha" button, it absolutely cannot be used.

[2] You must use pencil and erase.

[3] This is closed book.

[4] No notes nor formula sheets of any kind are allowed.

[5] Once the exam starts, you cannot leave the room. Use the facilities before the exam.

[6] No cell phone is allowed in the room.

There are no exceptions to these rules

OBJECTIVES

This core course teaches students how to obtain information from data and to build models for making decisions. The course is designed especially for students not majoring in a quantitative area, and is taught using a practical and example-based approach. The goal is to unify the student's ability to approach business-related problems by integrating methods and applications. The emphasis is on realistic business examples and the process by which a manager might analyze a problem – not on abstract theory or computational methods. ***The focus of the course is on understanding the meaning of both the numbers and the methods; not on computations.*** The course provides students with the skills to analyze business problems with tools they have access to and will use in their careers.

Essay Questions: there will be a *significant* emphasis on essay questions, more than on strict computations. For instance, one question might be this: "The correlation coefficient is -0.75 . Give the interpretation of this value." Thus the emphasis for this question is on the meaning of the numbers, rather than on how to compute them. ***There will be computations, as well, but this paragraph is an alert that exams will focus significantly on essay questions. All questions (either exact wording or very similar wording) which might asked on an exam will be asked and answered in class during the lectures.***

Note: Students may bring only a pencil and a simple calculator to the waiver exam. The calculator cannot store text, and cannot have a "Text" or "Alpha" button. No cellphones may accompany the student. No formula sheets or other information may accompany the student.

TEXT: Data Analysis & Decision Making with Microsoft Excel Albright, Winston, Zappe 3rd Edition, ISBN 0-324-37434-8 (there are several other possible ISBN's)

Newer or older versions will not differ significantly, and can be used to understand the material. If a different version has different chapter numbers, just go by the chapter headings as described below.

(Aside: This software plays no role in the Waiver Exam.)

SOFTWARE: The text comes with Microsoft Excel add-ins: StatPro, @RISK, PrecisionTree, BestFit, RISKView, TopRank, and SolverTable.

PREREQUISITES: a) Basic undergraduate statistics courses with grade of B or better; or 22:135:572 Stat for Mgrs. b) Calculus I with grade of B or better; or 22:135:571 Calc for Mgrs.

COURSE OUTLINE

Review (Chaps. 2, 3, 5, 6; 1 week – 1 class)

CH2: Describing Data: Graphs and Tables

CH3: Describing Data: Summary measures

CH5: Probability and Probability Distributions

CH6: Normal, Binomial, and Poisson Distributions

CH8: Review: Sampling and Sampling Distributions (Chap. 8; 0.5 weeks – 0.5 class)

(Entire chapter)

Sampling Terminology

Methods for Selecting Random Samples

An Introduction to Estimation

CH9,10: Review (Chaps. 9-10, 1 Weeks – 1 class)

CH9: Confidence Interval Estimation

CH10: Hypothesis Testing

CH11: Regression Analysis: Estimating Relationships (Chap. 11; 2 classes)

Scatterplots: Graphing Relationships

Correlations: Indicators of Linear Relationships

Simple Linear Regression

Multiple-Regression

Types of Models

Validation of the Fit

CH12: Regression Analysis: Statistical Inference (Chap 12; 2 classes)

(Excludes Include/Exclude decisions)

The Statistical Model

Inferences about the Regression Coefficients

Multicollinearity

Stepwise Regression

A Test for the Overall Fit: The ANOVA Table

The Partial F Test

Outliers

Violations of Regression Assumptions

Prediction

CH7: Decision Making under Uncertainty (Chap. 7; 2 weeks – 2 classes)

(Excludes: (1) Precision Tree add-in and (2) more Single-Stage examples)

Elements of a Decision Analysis

Introduction to Influence Diagrams

Multistage Decision problems

Bayes' Rule

Incorporating Attitudes toward Risk

CH13: Time Series Analysis and Forecasting (Chap 13; 2 weeks)

Forecasting Methods: An Overview

Random Series

The Random Walk Model

Autoregression Models

Regression-Based Trend Models

Moving Averages

Exponential Smoothing

Deseasonalizing: The Ratio-to-Moving-Averages Method

Estimating Seasonality with Regression

Econometric Models

CH14: Introduction to Optimization Modeling (Chap 14; 2 weeks)

A Brief History of Linear Programming

Introduction to LP Modeling

Sensitivity Analysis

The Linear Assumptions

Graphical Solution Method

Infeasibility and Unboundedness

Transportation and Assignment problems, especially

A Multiperiod Production Problem

A Decision Support System

CH15: Optimization Modeling: Applications (Chap 15; 1 week)

Static Workforce Scheduling

Blending Models

Logistics Models

Aggregate Planning Models

A Dynamic Financial Model

Integer Programming Models

Nonlinear Models

end