INSTRUCTOR'S MANUAL

TO ACCOMPANY

LEDOLTER AND HOGG:

APPLIED STATISTICS FOR ENGINEERS AND PHYSICAL SCIENTISTS

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Acknowledgments: I would like to thank Professor Erdogan Gunel of the Department of Statistics at West Virginia University and my son Thomas Ledolter, an engineering student at Northwestern University, for the careful checking of the solutions. My discussions with Thomas have also helped me understand how engineers and engineering students learn statistics.

1. INTRODUCTION

In preparing this instructor's manual, we have selected about eighty-five percent of the exercises and projects. Along with the answers and the "show that" type problems in the text, this manual provides the reader with answers to most of the exercises and projects.

The data sets used in this book are available on the Prentice Hall resource website as well as on Ledolter's website, www.biz.uiowa.edu/faculty/jledolter/AppliedStatistics. A summary and a brief description of the stored files are given in part 2 of this manual. The names of the files refer to the section and the location where the data are first used. For example, Section1.5Table1.5-1Cars refers to the data in Table 1.5-1 of Section 1.5, and the data set refers to cars. We have stored two versions of each file: A Minitab version (with file extension .MTW) and a text version (with file extension .TXT).

MINITAB, a popular statistical computer software, is used for most of the data analysis in this book. A short description and introduction to MINITAB are given in part 3 of this manual. Other software programs such as SAS, SPSS, and JMP could be used as well. Since these programs work on spreadsheets, using one or the other package should not cause any difficulties.

Part 4 of this manual gives an introduction to the R Project for Statistical Computing. The R approach to statistical computing is somewhat different from the spreadsheet approach of Minitab, as R analyses are executed through simple R-language instructions. The reasons for including R are two-fold: (1) The program is free. It can be downloaded, without charge, from the R website http://www.r-project.org. (2) The R statistical computing environment is very flexible and more comprehensive than that of commercially available software programs; R software is developed and maintained by

mathematicians and statisticians who are experts in their areas of specialization. Most engineering students are also familiar with programming in <u>Matlab</u>, and hence the switch to the R language should cause few difficulties.

Part 5 of this manual includes the detailed solutions to most of the exercises and projects.

2. LISTING OF DATA FILES STORED ON WEBSITES

There are two versions of each listed file: A Minitab worksheet (with extension .MTW) and a textfile (with extension .TXT).

Chapter 1

Section1.2Exercise1.2-1Thermostat
Section1.2Temperatures
Section1.3Exercise1.3-2MeltingPoint
Section1.3Exercise1.3-3Lead1976
Section1.3Exercise1.3-8Thickness
Section1.3Exercise1.3-13Hurricane
Section1.3Exercise1.3-14BatchYield
Section1.3Exercise1.3-18Survey
Section1.3Table1.3-1Strength
Section1.3TestScoresN=58
Section1.3TestScoresN=44
Section1.4Exercise1.4-3Jaffe
Section1.4Exercise1.4-6TwoProcesses
Section1.4Table1.4-1MisfeedingLeads
Section1.4LakeNeusiedl
Section1.4Lead1976&1977
Section1.5Exercise1.5-Fisher
Section1.5Exercise1.5-5Tukey
Section1.5Exercise1.5-6AirPollution
Section1.5Exercise1.5-7Time
Section1.5Exercise1.5-8ACT
Section1.5Exercise1.5-9Salary
Section1.5Table1.5-1Cars
Chapter1Project1MetalCutting
Chapter1Project2IowaFatalities
Chapter1Project2IowaVMT
Chapter1Project3Trucks
Chapter1Project9NHTemp

Chapter 3

Section3.1Exercise3.1-2Hours
Section3.1Exercise3.1-3Wind
Section3.6Exercise3.6-1Observations
Section3.6Exercise3.6-11Surgery

Chapter 4

Chapter4Project7ZieglerStudy1

Chapter4Project10Bootstrap
Chapter4Project11Permutation
Chapter4Project14Trucks

Chapter 5

Section5.1Exercise5.1-1Grant
Section5.1Exercise5.1-2Astro
Section5.1Exercise5.1-10Cartons
Section5.1Table5.1-1Chart
Section5.2Table5.2-Capability
Chapter5Project1Breeding

Chapter 6

Section6.1Exercise6.1-2Cuckoo
Section6.1Exercise6.1-3Strength
Section6.1Exercise6.1-6Strength
Section6.1Exercise6.1-10GPA
Section6.1Exercise6.1-11Salary
Section6.1Table6.1-2Deflection
Section6.2Exercise6.2-4Bakery
Section6.2Exercise6.2-9Youden1
Section6.2Exercise6.2-10Youden2
Section6.3Exercise6.3-1WearTester
Section6.3Exercise6.3-2Resistors
Section6.3Exercise6.3-3Productivity
Section6.3Exercise6.3-4Reaction
Section6.3Exercise6.3-6Sodium
Section6.3Table6.3-1Strength
Section6.4Exercise6.4-2Marigold
Section6.4Exercise6.4-3Tire
Section6.4Exercise6.4-4Cheese
Section6.4Table6.4-5Yield

Chapter 7

Section7.1Exercise7.1-3Sales
Section7.1Exercise7.1-4Brightness
Section7.1Exercise7.1-5Break
Section7.1Exercise7.1-9StressTest
Section7.1Table7.1-5Popcorn
Section7.2Exercise7.2-1Pigment
Section7.2Exercise7.2-4SteelBeam
Section7.2Table7.2-1Rod
Section7.3Exercise7.3-4Conversion

Chapter 8