Contact Information:

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Text: There is no required text book.

If you would like a reference book for the material that we will cover, the following texts cover most of the topics (but not necessarily in the same order covered in class).


**SAS Reference:** Past students found that *The Little SAS Book: A Primer*, Third Edition by Lora D. Delwiche, is a good reference for SAS. See the SAS bookstore website, http://support.sas.com/publishing/index.html, for other suggestions.

**R Reference:** *A Beginner's Guide to R* by Alain F. Zuur, Elena N. Ieno, and Erik Meesters (Use R. Springer) is a good introduction to R. See the R project website book page, http://www.r-project.org/, for other suggestions.
Course Description:
This is a data analysis course that shows how to use the statistical packages SAS and R to help solve both simple and complex real-life data problems including one-, two-, and k-sample statistical problems. Basic concepts include data preparation, modification, analysis, and interpretation of results.

Learning Outcomes:
As a result of completing this course, students will be able to:
1. Write basic SAS and R programs for simple data analysis problems;
2. Perform basic descriptive, exploratory and confirmatory data analysis; and
3. Identify appropriate modeling concepts based on the characteristics of the data.

Software
A student version of the SAS package will be available for course participants from GWU. It is highly recommended that students make use of this offer since it will allow them to work on problems at home on their own PC. The GWU computing lab is also available during regular business hours, unless used by another class. Details for obtaining the software can be found at [http://citl.gwu.edu/pages/sas.html](http://citl.gwu.edu/pages/sas.html).

Please print the request form [http://citl.gwu.edu/pdf/itl_SAS_User_License_Agreement_Form.pdf](http://citl.gwu.edu/pdf/itl_SAS_User_License_Agreement_Form.pdf) in class, and have it signed by either instructor before leaving class. You will need to bring a blank DVD to the Instructional Technology Lab to get SAS.

The latest version of R can be downloaded and installed from the R Project website, [http://www.r-project.org/](http://www.r-project.org/).

Teaching Style:
Each class will consist of brief lectures on important statistical concepts mixed with time working through problems on the computer. As much as possible, this will be a cooperative exercise, and students are encouraged to present their own solutions to problems discussed in class.

Because we will not be able to cover all the major statistical packages, any student familiar with a package that is not highlighted in the course may provide a brief package introduction to the class for his/her class presentation (see below). Students may also present special features of SAS or R that are not highlighted in the lectures. Student presentations must be scheduled in advance, and the student must submit an outline of the presentation to the instructors before the presentation date.

Attendance Policy:
Due to the fact that graduate courses meet for only 14 sessions per semester, participants are expected to be present for all sessions. Anyone who will miss a session must obtain prior approval, and arrange to turn in any assignments at a mutually agreed upon time.
Grading Criteria:
First Quiz 12 points
First Take-home exam 15 points
Second Quiz 12 points
Second Take-home exam 15 points
Final Examination 15 points
Class Presentation 15 points
Class Notes 8 points
Homework 8 points

Grading Scale
A = 94 to 100
A- = 90 to 93.9
B+ = 87 to 89.9
B = 84 to 86.9
B- = 80 to 83.9
C+ = 77 to 79.9
C = 74 to 76.9
C- = 70 to 73.9
F = Below 70

Quizzes:
Two short (about ½ hour) quizzes will be given—one during session 4, and one during session 11.
The quizzes will cover data analysis concepts discussed during prior class sessions. (12 points each)

Take-home Examinations:
Two take-home exams that concentrate on your ability to use a computing package to analyze data
and interpret the results will be given—one October 13th and one on December 8 (both in lieu of
class). You will be able to download the exam and a data set from Blackboard on the date of the
exam. Completed exams must be turned in, via Blackboard the day after the exam date by 9 am. (15
points each)

Final Examination:
The final examination will be given on Thursday of finals week (December 15) and will cover all
material presented during the semester. (15 points)

Class Presentation:
Each student will be required to make a 20 minute classroom presentation based on a data analysis
concept, or statistical computing package feature. The presentation may cover a statistical package
that is not highlighted in the course, a special feature of SAS, R, or another computing package, or a
summary of a data analysis project performed by the student. Student presentations will take place
during the last four class sessions of the semester. You will be required to submit a short
presentation proposal, and a draft of the presentation must be submitted to the instructors a
minimum of one week before the presentation date. Schedule of the presentations will be done
during the second half of the semester. (15 points)
Class Notes:
Students are expected to participate in class activities. Starting with session 2 (September 8), each student is asked to keep notes on how the student participated in class. This short set of notes—a few bullet points—should be submitted to the instructors via Blackboard by the Friday after each session. (8 points)

Homework:
Homework assignments will be given during most sessions, and must be submitted via Blackboard before the start of the next class session. Homework will not be graded for accuracy. Homework credit is given for your effort. If you have questions about assignments, ask questions at the start of each class. (8 points)

Tentative Schedule of Class Sessions:

Session #1: Overview of Statistical Computing Packages    Thursday, September 1st
• Introductions
• Course overview and review of syllabus
• Introduction to statistical computing packages
• Importing Text and Excel files into SAS

Session #2: Statistical Analysis Concepts    Thursday, September 8th
• Importing Text and Excel files into R
• Random Sample, Stratification, Survey Weights
• Descriptive Statistics, Graphical Analysis, Exploratory Analysis
• Confirmatory Analysis

Session #3: Univariate Analysis in SAS    Thursday, September 15th
• Exploratory Analysis
  o Descriptive Statistics
  o Graphical Analysis
  o Group Comparisons

Session #4: First Quiz and Univariate Analysis in R    Thursday, September 22nd
• First Quiz covering Univariate Analysis concepts (no computing package required)
• Confirmatory Analysis
  o Hypothesis Testing
• Univariate Methods in R

Session #5: Bivariate Analysis in SAS    Thursday, September 29th
• Exploratory Analysis (Descriptive Statistics and Graphical Analysis)
• Cross-tabulations
• Regression Concepts
• Correlation
Session #6: Bivariate Analysis (SAS and R)  
- Confirmatory Analysis  
- Hypothesis Testing  
- More on Regression, Correlation, and Cross-tabulation  
- Bivariate Methods in R  

Thursday, October 6th

Session #7: First Take-home Exam (no in-class session)  
- Exam will cover material from Session #1, September 1st – Session #6, October 6th.  
- Download exam and data set from Blackboard the evening of the exam  
- Submit the completed exam via Blackboard by 9 am October 14th.

Thursday, October 13th

Session #8: Multivariate Analysis  
- Exploratory Analysis  
  - Descriptive Statistics & Graphical Analysis  
  - Cross-tabulations  
- Multivariate Regression  
- Begin project discussions

Thursday, October 20th

Session #9: Multivariate Analysis (continued)  
- Confirmatory Analysis  
  - Hypothesis Testing  
  - More on Regression and Correlation  
- Finalize project assignments

Thursday, October 27th

Session #10: Multivariate Analysis  
- Multivariate Analysis

Thursday, November 3rd

Session #11: Second Quiz and Continuation of Topics  
- Second Quiz covering Multivariate Analysis concepts (no computing package required)  
- Complete unfinished topics from prior session  
- Student presentations

Thursday, November 10th

Session #12: Continuation of Topics  
- Multivariate Analysis  
- Student presentations

Thursday, November 17th

Thanksgiving Break – No class Thursday, November 24th

Session #13: Introduction to the Analysis of Survey Data  
- What's different about survey data?  
- What packages exist for analyzing the data properly?  
- Course Review

Thursday, December 1st

Session #14: Second Take-home Exam (no in-class session)  
- Exam will cover material from throughout the semester  
- Download exam and data set from Blackboard the evening of the exam  
- Submit the completed exam via Blackboard by 9 am December 9th.

Thursday, December 8th
Final Examination  
- Exam covers all material from all sessions, September 1st – December 1st

NOTE: IN ACCORDANCE WITH UNIVERSITY POLICY, THE FINAL EXAM WILL BE GIVEN DURING THE FINAL EXAM PERIOD AND NOT THE LAST WEEK OF THE SEMESTER

University Policy on Religious Holidays:
1. Students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance;
2. Faculty should extend to these students the courtesy of absence without penalty on such occasions, including permission to make up examinations;
3. Faculty who intend to observe a religious holiday should arrange at the beginning of the semester to reschedule missed classes or to make other provisions for their course-related activities.

ACADEMIC INTEGRITY
I personally support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see: http://www.gwu.edu/~ntegrity/code.html

SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM
DISABILITY SUPPORT SERVICES (DSS)
Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: http://gwired.gwu.edu/dss/

UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300
The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:
- crisis and emergency mental health consultations
- confidential assessment, counseling services (individual and small group), and referrals
http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices

SECURITY
In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.

NOTE: This syllabus is subject to change at the discretion of the course instructors; additional topics may be covered where deemed appropriate.