**SYLLABUS:**  
*STAT2183W.80*

**COURSE AND CONTACT INFORMATION**
Course: STAT2183W.80  
Semester: Spring 2015  
Time: Tuesday and Thursday 11:10 am to 12:25pm  
Location: ROME B104

**INSTRUCTOR**
Name: Dalila Benachenhou  
Campus Address: Rome Hall: Conference Room  
Phone: (202)994-6357  
E-mail: dalila_ben@gwu.edu  
Office hours: Tuesday 10:00 to 11:00 am, Thursday Upon Request

**TA**
Name: Liyi Jia  
Campus Address: Rome Hall: Room 556  
Phone: (202)994-6357  
E-mail: rw_kar@email.gwu.edu  
Office hours: upon request

**COURSE DESCRIPTION**

The purpose of this course is to teach the methodology and the skills needed to use the statistical packages SAS and R to analyze data from experiments or surveys. In addition to presenting information on statistical packages, this course will present many new statistical techniques on an applied level (innovative data visualization). The students are expected to be familiar with numerical measures of central tendency and variability, frequency distributions & graphical presentations, hypothesis testing, confidence interval, linear regression and correlation.

There will be 3 projects through the entire course. All projects must be handed on Blackboard.

Topics to be covered include:

A) Parametric Inference
   - Review: one sample z and t tests, including paired t-test  
   - Review: two sample z and t tests  
   - Categorical data  
   - Comparison of means for pop > 2
• Tests of independence and goodness of fit tests
• two and k sample test for the variance
• Regression and correlation (simple and multiple)
• Logistic Regression

B) Nonparametric Inference
• One sample sign test
• Two sample Wilcoxon Rank Sum test for location
• Kolmogorov-Smirnov normality test
• Kruskal-Wallis test

C) Plots
Learn how to plot and interpret the followings:
• QQ-plot
• Boxplot
• Bar-chart
• Pie
• Histogram
• Scatterplot

D) SAS
• Data manipulation
• Statistical Analysis: Hypothesis testing, and Categorical Data Analysis
• PROC Means, Univariate, Format, Freq, ttest, GLM, ANOVA, …
• Programming: If-statement, loops, function
• ODS

E) R
• Data manipulation
• Linear Regression
• Logistic Regression
• Plotting graphs
• Matrix manipulation
• Factor

F) Writing
• Report architecture
• Report content
• Formatting tables
• Captions and cross-references
COURSE PREREQUISITES

One course in statistics: STAT 1051, STAT 1053 or equivalent.

TEXTS

1. Introduction to Statistical Methods and Data Analysis
   Authors: R. Lyman Ott, and Michael Longnecker
   Publisher: Brooks/Colde

2. R in Action
   Author: Robert Kabacoff
   Publisher: Manning

3. SAS Statistics by Example
   Author: Ron Cody


LEARNING OUTCOMES:
At the end of the semester you should be able to

- Use the right statistical tool for the appropriate data.
- Interpret SAS or R output.
- Plot and interpret graphs.
- Write concise and convincing Statistical reports.
- Manipulate data through programming in SAS or R

GRADING

- midterm exam (30%),
- paper (30 %),
- final exam (30 %);
- Lab work (10 %)

+ In almost every class, you will be given a project to work on to reinforce your learning: graph interpretation, report writing, proper use of statistical tool, and proper interpretation of statistical packages outputs. Hence, you are required to come to class.
Notes:
- This is a “programming class”, when appropriate, I do expect code to accompany the answers.
- Mid-term and final are in class.

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

CLASS POLICIES

- If you work together on a report or programming, your work will not be graded.
- You are expected to provide a final well written report. Any report that looks like a draft will not be corrected.
- Late work: Will be accepted only for medical or religion reasons.
- Make-up exams: If for any reason you cannot take the mid-term, please inform me, so I can reschedule an appropriate date and time.

University Policy on Religious Holidays:
Please notify me during the first week of the semester if you intend to be absent from class for religious reasons. In such instances, you will not be penalized.

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/
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](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.

**CALENDAR**

<table>
<thead>
<tr>
<th>Classes Begin</th>
<th>Monday, January 12</th>
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<tbody>
<tr>
<td>Martin Luther King, Jr.</td>
<td>Monday, January 19</td>
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<tr>
<td>Project 1</td>
<td>January 29</td>
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<tr>
<td>Mid-Term</td>
<td>March 5</td>
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<tr>
<td>Project 2</td>
<td>February 26</td>
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<tr>
<td>Project 3</td>
<td>April 15</td>
</tr>
<tr>
<td>Spring Break</td>
<td>March 9-14</td>
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<tr>
<td>Make-up Day</td>
<td>Tuesday, April 28</td>
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* Regularly scheduled Tuesday classes will *not* meet.

<table>
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<tr>
<th>Last Day of Classes</th>
<th>Monday, April 27</th>
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<tbody>
<tr>
<td>Reading Days</td>
<td>Thursday, April 30 - Friday, May 1</td>
</tr>
<tr>
<td>Final Examinations</td>
<td><strong>Monday, May 4-Tuesday May 12</strong></td>
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Religious holidays are in Blackboard calendar.