Syllabus

COURSE AND CONTACT INFORMATION
• Course: STAT-6207 / Methods of Statistical Computing I
• Semester: Fall, 2015
• Time: Monday, 6:10-8:40PM
• Location: GELM 608

INSTRUCTOR
• Name: Yuanzhang Li, Ph.D.
• Address: 503 Robert Grant Ave, Silver Spring
• Phone: 301-319-9728
• E-mail: yli201301@gwu.edu (2 or 3 times weekly)
   Yuanzhang.li@yahoo.com (daily check)
   Yuanzhang.li2.civ@mail.mil (daily check)

• Office hours: Monday, 8:40-10:00PM, or 5PM-6PM by appointment

COURSE DESCRIPTION
Computational methods play significant role in modern statistical data analysis due to the model complexity with variety of underlying assumptions for the given data structure. In addition the size of data is growing rapidly. This course is an introduction to the modern, computationally intensive methods in statistics focusing on the aspects of the computational methods in data analysis and inference, and the development of statistical theory. In particular, the following general areas will be covered:
1. Numerical methods in statistics ("statistical computing")
2. Introduction statistical programming: Reading data tables and frames, data modification and aggregation.
3. Random number generator and random variable generating. Discrete and continuous random variables generating and testing
4. Linear Methods for Regression Analysis: multiple regression analysis, by using SAS
5. Matrix operation
6. Data analysis, graphs, tabulates and reports.
7. Perform most common statistical test and modeling, such as ANOVA, Regression, Logistic Regression, Count Models, Repeated Measures Analysis, etc.

COURSE PREREQUISITES
• A course in mathematical statistics and a course in matrix algebra are necessary
• A course in computer/statistical programming is helpful (although not necessary)

TEXTS
• Required: None
• Recommended
  o Statistical Computing by W.J. Kennedy, Jr. and J.E. Gentle ©CRC 1980
  o Statistical Hypothesis Testing with SAS and R (Hardcover), by Dirk Taeger, Sonja Kuhnt
  o SAS®Programming in the Pharmaceutical Industry, by Jack Shostak

• Additional course material will be provided by the instructor.

LEARNING OUTCOMES:
As a result of completing this course, students will be able to:
• Understand basic computer processes
• Perform numerical procedures
• Conduct statistical computing
• perform data analyses with SAS by using suitable statistical models.

GRADING
• Homework (10, hand in two weeks, weekly, take home): 40%, work independently.
• Quizzes (3, in class): 30%, work independently.
• Final exam: 30%, work independently.
A grade of INCOMPLETE will ONLY be given to a student who is passing the course and cannot complete the course due to illness or other (documented) circumstances beyond their control.

Software:
Most examples will be illustrated using SAS. Some homework problems will require the use of computer programs. Students are free to use the software of their preference.

Code of Academic Integrity:
All examinations, papers, and other graded work products and assignments are to be completed in conformance with The George Washington University 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

Prerequisite:
• A course in statistics and a course in numerical analysis or linear algebra.
• Computer programming skills

Homework and Projects:
Total 10 homework will be assigned, except for the week with quizzes. Your homework will be collected two weeks later.

Quizzes:
Three one hour quizzes will be given. If the quiz is missed, you will receive zero credit for that part of the grade. No make-up quiz will be given. In exceptional circumstances (e.g. well-documented medical problems), a missed midterm will not be counted when computing your course grade.

Final Exam: The take home final examination will be distributed on December 7th and received by the midnight of December 16.
In the event that you are going to miss an examination, you must notify me prior to the examination. There will be no make-up final.

Class Policy:
Late work will not be accepted. Except for medical cases (with proper documentation) there will be no make-ups. If you miss an exam or miss a deadline you get zero credit for that part. For university policies on teaching see http://www.gwu.edu/academic/Teaching/main.htm.

Student Services: If you experience difficulty in this course for any reason, please consult with me. If you have a disability and require accommodations, please notify me with a letter from DSS so that we can make arrangements.

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

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.

Other: Please turn your cell phone ringer off. No eating in the classroom.

Course Description:
The purpose of this course is to provide a broad overview of the statistical procedures for analyzing categorical data. Topics to be covered include inference for contingency tables, generalized linear models with emphasis on logistic regression and loglinear models, and on models for clustered/repeated measures. Any changes will be announced in the class.

Goals of Course
- Not necessarily remember how to write out all formulae.
- Know method assumptions
- Know how to use them for the data analyses
Know when to use methods.
Know limitations of methods
Know relationships among methods.
Know where to find information.
Know some theory.
Know how explain the results
Know how to use SAS to perform suitable analyses

Schedule (May Adjust, if needed)

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<thead>
<tr>
<th>Date</th>
<th>Lecture</th>
<th>Topic</th>
<th>Homework</th>
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<tbody>
<tr>
<td>8/31/2015</td>
<td>1</td>
<td>Introduction : binary operation</td>
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<tr>
<td>9/14/2015</td>
<td>2</td>
<td>Sas DATA and descript statistics</td>
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<td>9/21/2015</td>
<td>3</td>
<td>Generate random number</td>
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<td>9/28/2015</td>
<td>4</td>
<td>Generate Random Variable</td>
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<tr>
<td>10/5/2015</td>
<td>5</td>
<td>Simulation, Quiz 1</td>
<td>4</td>
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<tr>
<td>10/12/2015</td>
<td>6</td>
<td>Matrix algebra</td>
<td>5</td>
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<td>10/19/2015</td>
<td>7</td>
<td>SAS/IML</td>
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<td>10/26/2015</td>
<td>8</td>
<td>SAS/IML Quiz 2</td>
<td>6</td>
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<td>11/2/2015</td>
<td>9</td>
<td>table and tabulate</td>
<td>7</td>
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<td>11/9/2015</td>
<td>10</td>
<td>Graph</td>
<td>8</td>
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<td>11/16/2015</td>
<td>11</td>
<td>ANOVA and repeated measure</td>
<td>9</td>
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<td>11/23/2015</td>
<td>12</td>
<td>Regression</td>
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<td>12/7/2015</td>
<td>13</td>
<td>Incomplete data analysis, Quiz 3</td>
<td>10</td>
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<tr>
<td>12/14/2015</td>
<td>14</td>
<td>Counting data analysis</td>
<td>Distribute final exam</td>
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