COURSE AND CONTACT INFORMATION

STAT 6197 - Fundamentals of SAS Programming for Data Management
Section 10 CRN 94952
Fall 2019
Fridays 3:30-6:00 PM
ROME B104

INSTRUCTOR

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ROME B104

COURSE DESCRIPTION

This is a one-semester course designed to introduce students to SAS programming for accessing, managing, manipulating and summarizing data, and controlling, modifying, aggregating, combining and reshaping SAS data sets. The course will cover the SAS macro facility, and key aspects of both the Structured Query Language (SQL) and the Interactive Matrix Language (IML). The course will use the SASPy module (a Python interface to the SAS System) in Jupyter notebooks for applications that will use object-oriented methods and magic commands from the Python language and generate SAS code from Python scripts.

COUESE PREREQUISITES

This course is intended for students who have taken a course in programming and intend to develop an appreciation for the inner workings of SAS. Formal prerequisites for the course are an introductory course in statistics (e.g., STAT 1051 or 1053), prior knowledge of programming or permission of the instructor. Familiarity with SAS is desired but not required; however, students cannot receive credit for both STAT 4197 and STAT 6197.

TEXTS

Delwiche L, and Slaughter S. *The Little SAS Book: A Primer*, Fifth Edition Paperback – November 7, 2012 (Recommended)

Ottesen RA, Delwiche LD, and Slaughter SJ. *Exercises and Projects for The Little SAS Book*, Fifth Edition Paperback – July 1, 2015 (Recommended)

Cody, R. *Cody's Data Cleaning Techniques Using SAS*®, Third Edition - March 2017 (Recommended)

SAS® 9.4 Language Reference: Concept, Sixth Edition (Here is the link.)

Base SAS® 9.4 Procedures Guide, Seventh Edition (Here is the link.)

SAS® 9.4 SQL Procedure User's Guide Fourth Edition (Here is the link.)

SAS® 9.4 Macro Language: Reference Fifth Edition (Here is the link.)

SAS/IML 14.3 User's Guide (Here is the link.)

SASPy (Here is the link.)

SAS® SOFTWARE

In classroom, students can use SAS® software by logging in to computer workstations. However, the SAS License is available from the Instructional Technology Lab (ITL) free of charge to GWU students who have registered for this course and who intend to install the software in their own laptops. Here is the link for the form, which students are required to complete online, in order to request a link to download the SAS Software or a license update to their already installed SAS software.

Besides the licensed version of Base SAS® software from ITL, a free version of the software called SAS® University Edition is available for downloads from the web. Students are required to install SAS® University Edition in their own laptops. Here is the link for instructions on how to download and install SAS(R) University Edition. Here is an additional link for students to check out before downloading and installing SAS(R) University Edition. Students will be using SAS® University Edition in Jupyter Notebook for completing their homework and in-class assignments.

LEARNING OUTCOMES

After completing the course, students will be able to:

- read raw data and Microsoft Excel files into SAS data sets
- manipulate data using SAS expressions, functions, arrays, and Do Loops, etc.
- aggregate, combine, reshape and summarize data using DATA and PROC steps
- automate and customize the generating of SAS code using the macro facility
- manipulate matrices and SAS data sets using PROC IML
- run analytics with a Python interface to the SAS System in Jupyter notebooks

SCHEDULES OF LECTURES AND ASSESSMENTS

Week	Date	Lecture Topic	Assessment
1	08/30/2019	The SAS System: Concepts and Components	
2	09/06/2019	DATA Step: Reading Data and Creating Reports	Take-Home Assignment 1 Given
3	09/13/2019	Working with Formats/Informats and Transforming Data	
4	09/20/2019	Functions, Data Conversions, Do Loops, and Arrays	Quiz 1
5	09/27/2019	Controlling and Managing SAS Data Sets	
6	10/04/2019	Aggregating Data, and Combining SAS Data Sets (DATA Step vs. PROC SQL)	Take-Home Assignment 2 Given

Week	Date	Lecture Topic	Assessment
7	10/11/2019	Exploring and Summarizing Data, and Generating Reports (Base SAS PROC Steps and ODS)	Quiz 2
8	10/18/2019		Midterm Exam
9	10/25/2019	SAS Macro Language Basics	Take-Home Assignment 1 Due
10	11/01/2019	Macro Functions and Working with Macros	
11	11/08/2019	Additional Topics on the DATA Step and the Macro Facility	Quiz 3
12	11/15/2019	Matrix Operations and Functions in SAS/IML	Quiz 4/In-class Assignment, and Take-Home Assignment 2 Due
13	11/22/2019	Simulating Data with SAS and Calling R in a SAS/IML Session	Quiz 5/In-class Assignment (Optional)
14	Thanksgiving Break (no class on 11/29/2019)		
15	12/06/2019	Applications of the SASPy Module (a Python Interface to the SAS System) in Jupyter Notebook	
	12/13/2019 (Tentative date)		Final Exam

GRADING

For this course, there will be four quizzes/in-class assignments, two take-home assignments and two exams – a total of eight assessments. In addition, there will be an optional additional quiz/in-class assignment, which students can take and drop the lowest score in quizzes and in-class assignments. For each assessment, scores will be reported in points. To compute weighted average points with percentages, the following assessment category-specific weights will be used:

Four quizzes/in-class assignments (100 points each)	20%
Take-home assignment 1 (100 points)	10%
Take-home assignment 2 (100 points)	10%
Midterm exam (100 points)	30%
Final exam (100 points)	30%
Total	100%

Students should not assume that their overall weighted average points will be curved in the determination of their final grades. If the instructor decides to grade on a curve for this course, the choice for the curving methods is entirely at his discretion.

The final letter grades for the course will be reported based on the following numerical ranges of weighted average points with percentages: A = 94-100%, A- = 90-93%, B+ = 87-89%, B = 83-86%, B- = 80-82%, C+ = 77-79%, C = 73-76%, C- = 70-72%, D+ = 67-69%, D = 63-66%, D- = 60-62% and F <60%. However, the instructor will have the discretion to make changes to the above cutoffs. Students showing hard work inside and outside of classroom and exemplary participation in class may be given some positive consideration in determining the final course grades. Students must agree to the above methods of assigning the final course grades. All grades are non-negotiable!

CLASS POLICIES

- Lecture handouts will contain SAS' copyrighted course materials, which the instructor received by signing an agreement with SAS® Institute. They will be posted to Blackboard. Reproducing the materials by students is prohibited by law.
- Example code and materials that illustrate SAS language concepts and applications will be in private GitHub repositories, and students will be given read-only access to them.
- Homework assignments submitted after the deadlines will not be accepted for grading.
- There will be no make-up exams/tests or extra-credit assignments.
- Incomplete: A grade of incomplete may only be given to students who are passing the course and cannot complete the course due to well documented circumstances beyond their control. For additional information please refer to: http://bulletin.gwu.edu/university-regulations/#Gradincompletes.
- Students must turn off their mobile devices and store them out of reach during class sessions and exams.
- The instructor's response to students' e-mails may take more than 24 hours.
- University Policy on Observance of Religious Holidays: In accordance with University policy, 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. For additional information, please refer to: https://provost.gwu.edu/policies-procedures-and-guidelines.

HOURS OF DIRECT INSTRUCTION AND INDEPENDENT LEARNING PER WEEK

For this course, which spreads over a 15-week period (14 weeks of instruction time plus a 15th week reserved for the final exam), students are expected to spend 2.5 hours of direct instruction and a minimum of 5 hours of independent learning (outside of class) – a total of 7.5 hours per week.

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 https://studentconduct.gwu.edu/code-academic-integrity.

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, and confidential assessment, counseling services (individual and small group), and referrals. See here for details: http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices.

SECURITY

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