

**DS-540 Statistical Programming
Syllabus - Fall Semester 2016**

General Information:

Lecture With Laboratory, 09/06/2016 - 12/21/2016
Thursdays 6:00PM - 8:30PM, Pope Hall, Room 203
Instructor: Professor Letao Wang
Office Hours: Thursday 4:00PM - 6:00PM, Pope Hall, Room 203
Email: jowang@saintpeters.edu

Prerequisites:

- Undergraduate statistics, linear algebra, algorithms, data structures
- Programming experience on Windows, Mac or Linux computers

Course Outline:

The course gives an introduction to SAS or R programming for statistical analyses and managing, analyzing and visualizing data. Topics include numeric and non-numeric values, arithmetic and assignment operations, arrays and data frames, special values, classes and coercion. Students will learn to write functions, read/write files, use exceptions, measure execution times, perform sampling and confidence analyses, plot a linear regression. Students will explore tools for statistical simulation, large data analysis and data visualization, including interactive 3D plots.

Weekly Schedule:

- week 01: Syllabus review, Setup of SAS environment
- week 02: Accessing data, Producing detail reports SAS Quiz #1
- week 03: Formatting data value, Reading SAS data sets SAS Quiz #2
- week 04: Reading spreadsheet, Reading raw data files SAS Quiz #3
- week 05: Manipulating data, Combining data sets SAS Quiz #4
- week 06: Creating summary reports SAS Quiz #5
- week 07: SAS Exam SAS Project fullgrade
- week 08: RStudio, Arithmetic, Vector, Matrix, Array SAS Project halfgrade
- week 09: Non-numeric, List, Data frame, Class R Quiz #1
- week 10: Plot, Read/Write files, Conditions, Loops R Quiz #2
- week 11: Writing Functions, Exceptions, Timings R Quiz #3
- week 12: Probability, Distributions, Sampling R Quiz #4
- week 13: Confidence, Linear Regression R Quiz #5
- week 14: Plot Customization, Colors R Project fullgrade
- week 15: Grammar of Graphics, Interactive 3D Plots R Project halfgrade
- week 16: R Exam

Required Reading and Quizzes:

Students are responsible for reading the sections in the textbooks prior to the lecture. The lecture starts with a review of the sections followed by a 10-minute quiz.

- SAS Programming 1: Essentials, ISBN: 978-1-62959-735-5
- A First Course in Programming and Statistics, by Tilman M. Davies, July 2016, 832 pp. ISBN: 978-1-59327-651-5 <https://www.nostarch.com/bookofr>

Individual Projects:

Each student selects a dataset individually and uses it for both SAS and R projects. Students need to demonstrate that their datasets consist of at least 1,000 data points. Suggested data sources: data.gov, Quandl.com

Learning Outcomes:

- Ability to explore, analyze and visualize data using SAS and R
- Ability to perform statistical analysis, simulation and optimization
- Proficiency with tools for collaborative development and debugging

Outcome Measure and Grading:

- Quizzes:	5% of the final grade	10 x 5% = 50%
- SAS Project:	10% of the final grade	10% (subtotal 60%)
- SAS Exam:	15% of the final grade	15% (subtotal 75%)
- R Project:	10% of the final grade	10% (subtotal 85%)
- R Exam:	15% of the final grade	15% (subtotal 100%)

Final grade: A for 90% and above, B for 80% to 89%, etc. Plus and minus grades are based on active participation and constructive attitude in class.

Special Accommodations:

Students with special learning needs should work with the Academic Dean's office to develop appropriate accommodations.

Attendance Policy:

If a student misses a class, it is the student's responsibility to copy the instructions from classmates. Per school policy, students missing more than 2 classes will be automatically withdrawn with a failed grade.

Academic Honesty and Student Conduct:

To accurately monitor the progress of the class, students need to submit only original work (e.g. code, text, figures). Students need to familiarize themselves with academic rules at Saint Peter's University. If plagiarism occurs once, the test or assignment will be graded zero. If plagiarism occurs twice, the student will receive a failed grade.