

**Course Title:** **Biostatistical Computing**

**Course Number:** **BIST0535J031**

**Course Location:** **One River Front Plaza, 10th Fl, 1005**

**Course Date & Time:** **Spring 2023; Monday 6:00 – 8:00 PM**

**Course Instructor:** **Alejandro Castro**

Department of Biostatistics

Rutgers School of Public Health

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**Office Hours:** *TBD; On-line*

**Course Assistant:** **NA**

**Course Text (not required, but if you would like additional information):**

*The Little SAS Book, A Primer, Fifth Edition*, Delwiche and Slaughter, SAS Publishing.

*Applied Statistics and the SAS Programming Language*, Fifth Edition, Cody and Smith, Pearson Prentice Hall.

*For R: SAS and R – Data Management, Statistical Analysis and Graphics second edition*, Ken Kleinman and Nicholas J. Horton CRC Press

**Additional/Supplemental Readings/Resources:**

*Naked Statistics, Stripping the Dread from Data*, Charles Wheelan, 2009

SAS OnDemand/SAS Studio (free for academia) (© SAS Institute Inc., Cary, NC, USA) and Microsoft Office (© Microsoft Corporation). SAS OnDemand/SAS Studio is a program that runs in your web browser after you have created a free account on the SAS website. I will supply a walkthrough of steps necessary for using SAS Studio through SAS OnDemand.

[https://www.sas.com/en\\_us/software/on-demand-for-academics.html](https://www.sas.com/en_us/software/on-demand-for-academics.html)

R version 4.1.2 or higher and RStudio Version 2021.09.0 Build 351 – © 2009-2021 RStudio, Inc. R and R Studio are freeware that can be downloaded from the web.

R downloaded from: <http://www.r-project.org>

...and R Studio from: <https://www.rstudio.com/products/rstudio/download/>

**Course Description:**

(3 credits) This course introduces the student to SAS software (© SAS Institute Inc., Cary, NC, USA) and its use in data management and analysis. We will cover topics frequently used in public health applications. This course will also introduce students to the R and RStudio computer packages for data analysis. We will also briefly review Microsoft Excel (© Microsoft Corporation).

**Selected Department Competencies Addressed:** Each Department identifies competencies for each degree offered. The core competencies addressed in this course for the MPH for the Department of Quantitative Methods include:

- Demonstrate competency in the use of Statistical Analysis Software and R (if applicable)
- Create and work with high quality datasets related to research and public health
- Manipulate, analyze and interpret data using appropriate statistical tests
- Conceptualize public health or research questions using univariate, bivariate and basic multivariate analysis
- Understand basic design and methodologies of a research study
- Critically evaluate the epidemiological data by assessing the quality of data and their sources
- Communicate results by creating charts and graphs

Please visit the Department webpages on the School of Public Health’s website at <http://sph.rutgers.edu/> for additional competencies addressed by this course for other degrees and departments.

**Course Objectives:** By the completion of this course, students will be able to:

- Give an introduction and develop a basic competency in using SAS Software (© SAS Institute Inc., Cary, NC, USA), and Microsoft Office (© Microsoft Corporation). For those in the 3 credit class, it will introduce R and R studio for analysis and graphs.
- Understand the concepts of data management and analysis with a specific application to public health

**Course Requirements and Grading:** Letter grade based on the following

1. Class participation	20%
2. Classwork and homework	40%
3. Class projects	40%
Total:	100%

**Course Schedule:**

<b>Week</b>	<b>Date</b>	<b>Lecture Topic</b>	<b>Project/ Homework Due</b>
1	Jan 23	Introduction to SAS : First Program	
2	Jan 30	Data and Public Health 1. Excel advanced (if needed) 2. SAS for ACTG	
3	Feb 6	Finish SAS Basics 1.Open up SAS 2.Libnames 101 3.Open up the ACTG175 data 4.SAS Procedures 5.Recreate Table 1	Homework_ACTG:  Complete population of Table 1: ACTG Trial
4	Feb 13	Review Table 1  SAS Basics 1. Formats 2. Reading SAS Datasets	Homework2:  Run a small program
5	Feb 20	Review Homework_week4  Intro to programming concepts – 1. Reading Raw Data Files 2. Begin Data Manipulation	
6	Feb 27	Data Manipulation 1. Continue Data Manipulation in SAS 2. Save as SAS Data, SAS code	Homework_data_manipulation:  Data Manipulation
7	Mar 6	Oswego Project	Oswego outbreak table
8	Mar 20	Modifying and Combining Data 1. Retrieve SAS code 2. Combining Datasets	Homework_merge_data:  Merging Homework
9	Mar 27	Introduce Continuous Data Analysis: 1. Correlation Analysis/Proc cor	

Week	Date	Lecture Topic	Project/ Homework Due
10	Apr 3	Finish Continuous Data Analysis: 1. Simple Linear Regression 2. Multiple Linear Regression	Homework_continuous_data: 1. Correlation Analysis 2. Linear regression
11	Apr 10	Introduction to Categorical Data Analysis: 1. Chi-Square/Trend	
12	Apr 17	Finish Categorical Data Analysis: 1. Logistic Regression	Homework_categorical_data: Logistic Regression
13	Apr 24	Introduction to R	
14	May 1	Programming Concepts – Intro to Graphics/ggplot2	
15	May 8	Final R Project	Final R Project

**School of Public Health Honor Code:** The School of Public Health Honor Code is found in the student bulletin ([sph.rutgers.edu/academics/catalog/index.html](http://sph.rutgers.edu/academics/catalog/index.html) ). Each student bears a fundamental responsibility for maintaining academic integrity and intellectual honesty in his or her graduate work. For example, all students are expected to observe the generally accepted principles of scholarly work, to submit their own rather than another's work, to refrain from falsifying data, and to refrain from receiving and/or giving aid on examinations or other assigned work requiring independent effort. In submitting written material, the writer takes full responsibility for the work as a whole and implies that, except as properly noted by use of quotation marks, footnotes, etc., both the ideas and the works used are his or her own. In addition to maintaining personal academic integrity, each student is expected to contribute to the academic integrity of the school community by not facilitating inappropriate use of her/his own work by others and by reporting acts of academic dishonesty by others to an appropriate school authority. It should be clearly understood that plagiarism, cheating, or other forms of academic dishonesty will not be tolerated and can lead to sanctions up to and including separation from the Rutgers School of Public Health.

**Policy Concerning Use of Recording Devices and Other Electronic Communications Systems:**

When personally owned communication/recording devices are used by students to record lectures and/or classroom lessons, such use must be authorized by the faculty member or instructor who must give either oral or written permission prior to the start of the semester and identify restrictions, if any, on the use of mobile communications or recording devices.