

## STA 3732 Statistical Tools for Data Analytics Spring 2023 Course Syllabus

**Instructor:** Dr. Steven Ramsier

**Office:** 102B OSB

**Office Hours:** 10:30 AM to 11:30 AM on Wednesdays (In-person in office)  
1:00 PM to 2:00 PM on Thursdays. (Virtual through Zoom, see Canvas)

**Email:** ramsier@stat.fsu.edu

**Phone:** 644-3218 (Main Statistics office phone – currently no direct line to the instructor)

**Fax:** 644-5271

**TAs/Grader:** Yi Chen

**E-mail:** ychen22@fsu.edu

Virtual Help Hour: 1:00 PM to 2:00 PM on Wednesdays

**Class Meeting Times:** The class involves asynchronous delivery. You may work on a schedule of your choosing that permits you to meet weekly due dates/times and allows you to work with two or three other students during a designated week in order to complete a project.

**Final Period:** *No Final Exam*

**Prerequisite:** STA 3024 or instructor permission.

**Course Description:** This course provides statistical perspectives on the methods and software tools used in the data analytics discipline. The student will gain practical experience with the applications used to prepare, explore, visualize, experiment with, and make predictions from data. The role of the data analyst in the data science workflow will be addressed by completing assignments involving actual data.

Students will gain experience managing data to derive critical insights into the study topic. Methods of accessing, summarizing, plotting, and modeling data will be discussed and applied. Exercises will encompass the four types of analytics: descriptive, diagnostic, predictive, and prescriptive analytics, and students will gain perspective on their part in the practice of data science.

**Student Learning Objectives:** Upon completion of the course, students will be able to

1. Execute the extract, transform, and load process and recognize its role in data analytics.
2. Demonstrate proficiency in obtaining, accessing, cleaning, combining, and restructuring data to complete the intended analysis.
3. Implement an exploratory data analysis using data visualization applications.
4. Create graphical dashboards and use them to compose a data story, associating quantitative results with real-world issues.
5. Construct appropriate models and interpret them to generate meaningful insights about an underlying relationship.
6. Explain the function of machine learning in data science and apply some of its basic tools.
7. Develop a presentation on key findings in a manner that is accessible to stakeholders in leadership positions.

**Required Materials:** Students will need the following;

- A personal computer (Windows or macOS operating systems preferred) with a reliable internet connection.
- Plenty of disk space is needed with the ability to load software on your computer. We will be using free/open-source software, so none will need to be purchased.
- A textbook is not required for this course. The instructor will provide all required course materials posted on the course Canvas site. However, the following texts will be used as references:
  - Shields, W 2019, *SQL QuickStart Guide: The Simplified Beginner's Guide to Managing, Analyzing, and Manipulating Data with SQL*, Clydebank Media LLC, Albany.  
ISBN-13: 9781945051753

- Loth, A 2019, *Visual Analytics with Tableau*, Wiley, Indianapolis.  
ISBN-13: 978-1119560203
- McCoy, S 2021, *Murach's Python for Data Analysis*, Murach, Fresno.  
ISBN-13: 978-1-943872-76-3
- Other references will be provided during the semester.

**Grade Composition (1000 Points Total):**

First Day Attendance Activity	10
Starter Assignment	40
5 Assignments (150 points each)	750
Project Presentation	<u>200</u>
Total	1000

**Grade Assignments (Based on total course points earned):**

A 930-1000	B- 800-829	D+ 670-699
A- 900- 929	C+ 770-799	D 630-669
B+ 870-899	C 730-769	D- 600-629
B 830-869	C- 700-729	F 0-599

**Student Assignments and Responsibilities**

**Introduction:** This is an online course. The materials covered and the work required are the same for a face-to-face class. Each student must spend at least three hours per week viewing recorded lectures, practicing with the specific software tool, and completing various assessments. Required and supplementary materials for the course are available on the Canvas site.

**Lecture Materials:** Viewing recorded lectures is required of all students. Recorded lecture materials, lecture slides with detailed notes, and other materials are available online and presented weekly. Please note that the recorded lectures and other recordings are the property of Florida State University and are being made available only to the students enrolled in this class. Students are not permitted to share the recorded lectures or other recordings with others outside of this class. Copyrights of the recorded lectures and other recordings are reserved by the instructor and Florida State University.

**Discussion Board:** Discussion boards will be used from time to time to help facilitate class activities. Participation can be used for attendance purposes or for working on a team project.

**Assignments:** The assignments will consist of problems that will be solved using specified software. Some portions of the assignment will consist of critiquing an analysis that has already been carried out. Other parts will involve just data and carrying out your analysis. There will be six (6) assignments given, with the first one (Starter Assignment) being a minor assignment so that students can familiarize themselves with the submission process. All assignments are to be turned in on the Thursday that they are **due no later than 11:59 PM**. Assignment documents are uploaded via Canvas, and **no emailed assignments will be accepted**.

Late, unexcused assignments will be penalized as follows: turned in by 11:59 PM the following Friday – 90% of the grade, turned in by 11:59 PM the Saturday after it was due – 75% of the grade, after that – no credit. Assignments are graded on several components: Correct functions and procedures, properly executable, correct results, and correct interpretations.

If you miss an assignment, your incompleteness must be excused. Excused incompletenesses are granted for emergencies such as a death in the family, treatment of an injury, or illness at a medical facility.

**Documentation is required.** It is at the instructor's discretion as to how to handle excused incompletenesses of assignments. For conflicts resulting from university organizational events, weddings, work-related trips, etc., that are known in advance, the instructor will handle them individually (usually provisions for turning in the assignment at the first opportunity to do so).

You are free to discuss the assignment with any of your classmates; however, the activity of students "working together" is not permitted. Your programming, interpretation, and write-up must be done independently. That is, all code, output, and explanations must be generated only by you and you alone. Your interpretations must be in your own words. Sharing documents and using any portion of another student's (past or present) work and representing it as your own, will result in a score of zero on the assignment.

**Project:** Students will work on a data visualization project in teams of 3 to 4 students.. The project will focus on different elements of a data storytelling process. Students are encouraged to select a topic for which they are passionate about such that research questions may be formulated and corresponding data obtained. The data used will be of the student's choosing in consultation with the instructor. Initial guidance may be given to ensure an effective project. **The Project Presentation** will involve creating insightful graphical representations of the data. The presentation will consist of dashboards that address several of the different characteristics of analytics (descriptive, diagnostic, predictive, and prescriptive). These dashboards will be part of telling a story contained in the data. Students will produce a video (e.g., Kaltura or Zoom) to be uploaded for the entire class to view and provide comments.

In general, the complete project consists of finding a data set of interest, employing graphical methods for presenting the data, organizing the graphics in a logical sequence, creating a compelling narrative that weaves a story out of the pictures, and interpreting the real-world implications of the results. To the best of your knowledge, the project data set should not have been previously analyzed in the way you plan to use it for your project.

**Grade Complaints:** Address your work in question first to the TA. Provide a **clear, brief, written explanation** of why you think you deserve additional credit. The written statement must be provided **within one week** after the work is graded and available to the class in general. All grade disputes must be resolved by the last day of normal classes (before finals week).

**Other Grade Issues:** All course work that was granted an extension for medical reasons, etc., must be completed by the agreed upon deadline. Under no circumstances will modified due dates extend beyond last day of classes (before finals week). Final course point totals will be assigned letter grades according to the Grade Assignments scale given above. There will be **no rounding up of final point totals**. Please do not send messages asking for your point total to be rounded up because you will not get a response.as the policy is set as described above.

## Tentative Course Outline and Sample Schedule:

Week of	Topics	Assignments/Project
Jan. 9	Intro/Extract, Transform, Load (ETL) Concept	
Jan. 16	Databases, SQL, Queries, Operators	Starter Assignment due 1/19
Jan. 23	Conditional Expressions, Cleaning Data	
Jan. 30	Aggregation, Transforming Data, Joins	Assignment 1 due 2/2
Feb. 6	Unions, Import/Export	
Feb. 13	Subqueries, Views	Assignment 2 due 2/16
Feb. 20	Data Visualization Platform, Importing Data	
Feb. 27	Types of Charts, Functions, Calculations	
Mar. 6	Statistical Methods Used in Visualization	Assignment 3 due 3/9
Mar. 13	<i>Spring Break</i>	
Mar. 20	Dashboards, Interactivity, Data Stories	
Mar. 27	Project Time	Vis. Proj. Presentation due 3/30
Apr. 3	Using Notebooks for Data Analytics	
Apr. 10	Navigating the Programming Environment	Assignment 4 due 4/13
Apr. 17	Statistical Analysis Packages	
Apr. 24	Brief Introduction to Machine Learning	Assignment 5 due 4/27

### University Attendance Policy:

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

### Academic Honor Policy:

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "...be honest and truthful and...[to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/academic-resources/academic-integrity-and-grievances/academic-honor-policy>)

### Academic Success:

Your academic success is a top priority for Florida State University. University resources to help you succeed include tutoring centers, computer labs, counseling and health services, and services for designated groups, such as veterans and students with disabilities. The following information is not exhaustive, so please check with your advisor or the Department of Student Support and Transitions to learn more.

### Students with Disabilities Act:

Florida State University (FSU) values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive, and welcoming. FSU is committed to providing reasonable accommodations for all persons with disabilities in a manner that is consistent with academic standards of the course while empowering the student to meet integral requirements of the course.

To receive academic accommodations, a student:

- (1) must register with and provide documentation to the Office of Accessibility Services (OAS);
- (2) must provide a letter from OAS to the instructor indicating the need for accommodation and what type; and,
- (3) should communicate with the instructor, as needed, to discuss recommended accommodations. A request for a meeting may be initiated by the student or the instructor.

Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from the Office of Accessibility Services has been provided.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact the Office of Accessibility Services

874 Traditions Way

108 Student Services Building

Florida State University

Tallahassee, FL 32306-4167

(850) 644-9566 (voice)

(850) 644-8504 (TDD)

[oas@fsu.edu](mailto:oas@fsu.edu)

<https://dsst.fsu.edu/oas>

### **Confidential Campus Resources:**

Various centers and programs are available to assist students with navigating stressors that might impact academic success. These include the following:

Victim Advocate Program

University Center A, Rm. 4100

(850) 644-7161

Available 24/7/365

Office Hours: M-F 8-5

<https://dsst.fsu.edu/vap>

Counseling and Psychological Services

Askew Student Life Center, 2nd floor

942 Learning Way

(850) 644-8255

<https://counseling.fsu.edu/>

University Health Services

Health and Wellness Center

(850) 644-6230

<https://uhs.fsu.edu/>

### **Syllabus Change Policy:**

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.