STAT 151: Introduction to Statistical Computing

Instructor: **email:**

Office Hours:

Other References:

- R for Data Science (Wickham & Grolemund)

- Python Data Science Handbook (Vanderplas)

Prerequisites: Stat 101, concurrent registration in Stat 102

Course Description: Introduction to programming for statistical analysis. Covers basic programming concepts necessary for statistics, good computing practice, and use of built-in functions to complete basic statistical analyses.

Course Goals:

- Comfortable with one or more programming languages used in statistical computing

- Basic programing skills such as writing a for loop, logic, and matrix arithmetic.

- Implement basic data analyses in a programming language.

- Able to describe the sequence of logical or mathematical steps necessary to solve a simple problem

- Familiar with good computing practices, such as version control and documentation

Grading:

Assignment(s)	Contribution to Final Grade
Homework	50%
Class Participation	25%
Final Exam	25%

Grade	Final Percentage Range
A	94.0-100
A-	90.0-93.99
B+	88.0-89.99
B	84.0-87.99
B-	80.0-83.99
C+	78.0-79.99
C	74.0-77.99
C-	70.0-73.99
D+	68.0-69.99
D	64.0-67.99
D-	60.0-63.99
F	<60.0

Grading Scale: (applies to table above)

Course Expectations: In this course, you are expected to have professional behavior. You are expected to attend all class meetings, be curious, ask questions, seek opportunities to learn, and be open and responsive to constructive feedback. In addition:

- Be an active participant–statistics is not a spectator sport!

- Be committed, take your work seriously

- Engage with the in-class activities and homework sets

- Help others–if you understand the material being discussed, practice your mentoring skills. This does not means sharing answers, but instead helping others understand the concepts.

- Complete assigned readings.

You are also expected to exhibit a professional demeanor (language, attitude) toward others. Disagreement during discussions is welcome and often productive in developing a deeper understanding of the concepts being discussed. However, disagreement does not warrant yelling or disrespectful language or behavior. Unprofessional behavior will not be tolerated, and appropriate actions will be taken to prevent future occurrences.

Homework: Approximately 8-10 homework assignments will be made over the course of the semester. You will typically have one week to work on each of the assignments. The only way to learn statistics is to practice working problems, and homework is therefore an essential part of the course. Homework must be submitted in the file format specified, and should run or compile as submitted.

Class Participation: All students are expected to attend and fully participate in class activities. Participation will be determined based on a combination of class attendance and activities.

Final Exam: The final exam will be open-book and open note, and will take place on XXXX XX-XXam/pm.

Tentative Course Outline:

Week	Topics
1	Basic mathematical operations
2	Data types
3	Vectors, matrices, and indexing
4	Complex data types (lists, data frames)
5	Reading data files and formats
6	Functions
7	Statistical distribution functions
8	Built-in functions for t-tests
9	Built-in functions for linear modeling
10	Reading help files
11	Reading and writing pseudocode
12	Writing reproducible documents in Rmarkdown
13	Writing reproducible documents in Rmarkdown
14	Version control systems (git + github)
15	Other topics