Syllabus

Suresh L. Paul

BUS622: DEVELOP TOOLS IN BUSINESS ANALYTICS[1]

R AND PYTHON PROGRAMMING FOR MANAGERS

INSTRUCTOR INFORMATION

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COURSE INFORMATION

Meeting room: Bloomberg Research Center Lab
Time: 6:15PM - 9:00PM on Mondays
Office hours: by appointment only

COURSE DESCRIPTION

This course introduces students to various tools in business analytics development and reporting. Students are introduced to the basics of programming with R and Python to develop a working knowledge of how to acquire, manage, and visualize data.

LEARNING OUTCOMES

- Understand and use R functions in business data analysis
- Understand and apply the main concepts used in data science and business analytics using functions and tools developed in Python
- Understand and apply basic coding and programing with tools such as R and Python

COURSE MATERIALS

Texbook: no assigned textbook; readings, sample code, and assignments provided by the instructor via *Canvas*
Datasets: provided by the instructor

[1]This PDF document was produced from markdown using RStudio v2024.4.1.748.

COMPUTING NEEDS

The Bloomberg Lab will be open during regular business hours and is equipped with all the necessary software for the course. If you plan to attend any class online, it is your responsibility to have a computer with all required software installed. If you need assistance installing R or Python, please contact the BW IT department.

GRADING

Grade Categories	%
Homework Assignments	70
Project Report	20
Attendance & Class Participation	10

HOMEWORK ASSIGNMENTS

All homework assignments must be completed individually and submitted online via Canvas by the due date. Points will be deducted for late submissions or incomplete work. If you're unfamiliar with how to upload homework assignments on Canvas, please schedule an appointment with the BW IT department for assistance.

USE OF AI FOR CODING

The *ethical* use of AI as a coding companion is encouraged. Its usage should align with the course's learning standards and should not serve as a substitute for the coding skills taught in class. Proper logging is also recommended.

PROJECT

You will write a paper showing your research, quantitative, and coding skills developed in this course. The code will be attached as an addendum to your project report. You will start with an interesting topic to work on, search for data sources and extract applicable data, designing a statistical analysis and explain all anticipated results, code your econometric analysis and produce results, explain your code for each analysis performed, and maintain a thorough documentation of all steps involved. If you have no data to work on, one will be assigned to you. Note that this project will be completed in stages as the course progresses. And, to proceed to the next stage, all your prior work must be discussed in class and approved. Additionally, you are expected to make a professional presentation on the final meeting of the course.

Framework

- Explain the research question
- Describe the data contents
- Explain the treatment of missing variables
- Explain the merging, subsetting and filtering logic
- Conduct exploratory data analysis
  - initial plots / normal distribution
  - summarise
- Descriptive Statistics and associated plots
- Report Writing

Project datasets

- OHLCV data on trading assets

ATTENDANCE POLICY

Attendance is mandatory and essential for success in this course. You can either attend the class in-person or online via Zoom. If you are unable to attend the class live during class timings, you *may* listen to the class recordings via *Panopto* in *Canvas*. Each class content is tailored for you to successfully finish the project, which carries substantial portion of your grade. In addition, class participation carries crucial grade points. You should make efforts to attend every class during class timings unless you have a medically certified illness, death in the family, or University-sponsored activity. You are responsible for keeping up with all the lecture material and announcements made in classes.

COURSE SCHEDULE

Week 1: OCTOBER 21st

- Syllabus discussion
- Introduction and basic console coding in *R* & *Python*
- Homework Assignment I

Week 2: OCTOBER 28th

- Basic *R* programming
  - Introduction to *dplyR*
  - Import and Save datasets
  - Simple *SQL* programming with *dplyR*
  - Creating *R* Scripts
  - Using *dplyR* features
    - Create
    - Subset
    - Mutate / Transmute
    - Filter
    - Sort (Arrange)
    - Grouping and Summarise
    - Top N
  - Treatment of missing data
- Homework Assignment II

Week 3: NOVEMBER 4th

- Working with plots
  - Plots as diagnostic tools (initial exploratory analysis)
  - Create different plot types using base R
    - Scatter
    - Line

        * Bar
        * Box
        * Pie
    - Using *ggplot*
    - Multiple plots side-by-side
- Miscellaneous R topics
    - Functions
    - Loops
    - Merging
    - Date treatment
- Homework Assignment III

Week 4: NOVEMBER 11th

- Miscellaneous R topics (cont'd.)

Week 5: NOVEMBER 18th

- Introduction to *Python*
- Basic calculations using *numpy* and *pandas*
- Importing datasets
- Homework Assignment IV

Week 5: NOVEMBER 25th

- Basic Python Programming
    - Functions
    - Loops
- Demo of some R codes and Python codes
    - Bloomberg bot
- Homework Assignment V

Week 6: DECEMBER 2nd

- Project Review

Week 7: DECEMBER 9th

- Project Review