

Programming in R - Finance Application: Course Syllabus

January 2, 2022

1 Course Information

- Semester: Spring 2022
- Time: Thursday 6 pm to 9 pm
- Instructor: Yu Li, PhD
- Contact: lyjade40@gmail.com

2 Learning Objectives

- Learn R programming basics
- Learn how to write R codes to conduct common analyses in quantitative finance
- Learn how to use R Markdown and R Shiny to create reports and web pages

3 Previous Coding Experience

- No previous coding experience is required. No previous R experience is required.

4 Teaching Method

- Each class will consist of two parts: lecture and hands-on

5 Textbook

- No required textbook. Handouts will be distributed before each class

6 Useful References

- "R for Data Science" by Hadley Wickham and Garrett Golemund, <https://r4ds.had.co.nz/>
- "A moderndive into R and the tidyverse" by Chester Ismay and Albert Y. Kim, <https://moderndive.com/>
- "An Introduction to Analysis of Financial Data with R" by Ruey S. Tsay, <https://faculty.chicagobooth.edu/ruey.tsay/teaching/introTS/>
- <http://education.rstudio.com/>
- <https://stackoverflow.com/>

7 Grading Policy

- 4 Assignments + 1 Midterm Exam + 1 Final Project

Assignments	4*20	80 points
Midterm	100	100 points
Final Project	100	100 points
Total		280 points

270 - 280	A	170 - 189	C+
250 - 269	A-	150 - 169	C
230 - 249	B+	130 - 149	C-
210 - 229	B	110 - 129	D
190 - 209	B-	Below 110	F

8 Potential Project Topics

- Market return predictability:
 - Does any variable predict the market return?
- Stock return predictability:
 - Is there a January effect?
 - Is there a weekend effect?
 - Is the momentum trading strategy profitable?
- Portfolio management:
 - How shall we allocate money among different ETFs/mutual funds?

9 Tentative Schedule

Date	Topics	Assignments
Week 1 (Jan 20)	Course overview	
Week 2 (Jan 27)	RStudio introduction & Interactive programming	
Week 3 (Feb 3)	Script programming	Assignment 1
Week 4 (Feb 10)	Data wrangling	Assignment 2
Week 5 (Feb 17)	Structure control	
Week 6 (Feb 24)	Data visualization	Assignment 3
Week 7 (Mar 3)	Writing functions	
Week 8 (Mar 10)	Mid-term exam	
Week 9 (Mar 17)	Spring break	
Week 10 (Mar 24)	Linear regression	Assignment 4
Week 11 (Mar 31)	Quantitative Finance functions	
Week 12 (Apr 7)	Machine learning	
Week 13 (Apr 14)	R Markdown	
Week 14 (Apr 21)	R Shiny	
Week 15 (Apr 28)	Review and questions	
Week 16 (May 5)	Final project	

10 Final Schedule

Date	Topics	Main Content	Application
Week 1 (Jan 20)	Course overview		