

Programming in R - Finance Application - Course Syllabus

January 16, 2025

1. Course Information

- **Semester:** Spring 2025
 - **Time:** Thursday 6 pm to 9 pm
 - **Instructor:** Zhibai (Ray) Chen
 - Email:** zchen67@cougarnet.uh.edu
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2. Learning Objectives

- Learn R Fundamentals
 - R in comprehensive Data Analysis
 - R applications in Finance
 - R for Visualization and Reporting
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3. Previous Coding Experience

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

- No required textbook. Handouts will be distributed before each class.
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5. 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/>
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6. Grading Policy

- **9 Assignments (8 graded)+ 1 Final Project + Bonus**
 - Assignments: $8 * 15 = 120$ points (Pick the Best 10 scores, namely you could drop the worst one); Assignment 0 is to help setup your R Env (not graded)
 - Mid-term: 60 points:
 - Final Project: 100 points
 - Bonus: 20 points
 - **Total:** 280 points

Grading Scale:

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

7. Tentative Schedule

Date	Topics	Assignments
Week 1	Course Overview & R Introduction	Survey
Week 2	Data Structures and Basic Operations - Functions	Assignment 0 - Setup R
Week 3	Introduction to Data Manipulation 1 (data.table)	
Week 4	Introduction to Data Manipulation 2 (Tidyverse)	Assignment 1
Week 5	Introduction to Data Manipulation 3 (Tidyverse)	Assignment 2
Week 6	Data Visualization with ggplot2	Assignment 3
Week 7	Statistical Learning	Assignment 4
Week 8	Midterm Exam (Bonus HW Released)	Assignment 5
Week 9	Spring Break	
Week 10	Portfolio Theory (Mean-Variance Optimization)	Assignment 6
Week 11	Factor Models	Assignment 7
Week 12	What is Backtesting	Assignment 8
Week 13	Machine Learning Basics - Final Project Starts	Assignment 9
Week 14	R Package	
Week 15	Review and Questions. Final Project Closes	