

## Business Analytics and Information Technology

Course Number: 33:136:450

Course Title: Investment Modeling in R

### COURSE DESCRIPTION

This course is meant to be an introduction to Quantitative Value Investing Techniques, in particular, scoring a security based on a multi-factor model and back testing the results of using that model. The data and analysis will be done using R and the financial package quantmod. Fundamental data going back 20 years will be provided.

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### COURSE MATERIALS

- Slides, Programs, Notes posted on Canvas
  - Papers posted on Canvas
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### LEARNING GOALS AND OBJECTIVES

The goal of this class is to learn how to program and do data analysis in R and understand how to value publicly traded companies according to their fundamental values.

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### ACADEMIC INTEGRITY

*I do NOT tolerate cheating.* Students are responsible for understanding the RU Academic Integrity Policy (<http://academicintegrity.rutgers.edu/>).

I will strongly enforce this Policy and pursue *all* violations. On all examinations and assignments, students must sign the RU Honor Pledge, which states, “On my honor, I have neither received nor given any unauthorized assistance on this examination or assignment.” I will screen all written assignments through *SafeAssign* or *Turnitin*, plagiarism detection services that compare the work against a large database of past work. Don’t let cheating destroy your hard-earned opportunity to learn. See [business.rutgers.edu/ai](http://business.rutgers.edu/ai) for more details.

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### ATTENDANCE AND PREPARATION POLICY

- Attendance is not required but is strongly recommended.

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## CLASSROOM CONDUCT

Please respect your fellow classmates by not disrupting the lectures or talking while they are trying to ask questions.

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## EXAM DATES AND POLICIES

There are 3 exams in this course:

**Midterm Exam 1:** (), bring a calculator, 1 cheat sheet both sides

**Midterm Exam 2:** (), bring a calculator, 1 cheat sheet both sides, it is **cumulative**

**Final Exam:** TBD, it is **cumulative**, bring a calculator, 1 cheat sheet both sides

During exams, the following rules apply:

- If you have a disability that influences testing procedures, provide me an official letter from the Office of Disability Services at the start of the semester.
  - Cell phones must be turned off, screen side down. You cannot touch your phone until you submit your exam.
  - You must show a valid Rutgers photo ID to enter the room and to turn in the exam.
  - I will randomly assign seating for the exams.
  - Use the bathroom prior to the exam start; bathroom breaks, if essential, will be escorted.
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## GRADING POLICY

Course grades are determined as follows:

\*Labs are meant for you to practice the lessons from the class, and allow me to give individual attention to students with their programming

Labs – 0 pts (just practice, no pressure)

HW1 – 0 pts (just practice, no pressure)

HW2 – 0 pts (just practice, no pressure)

Midterm 1 – 130 pts

Midterm 2 – 130 pts

Final – 240 pts

The Stock Game:

- 1st place 50 pts
- 2nd place 10 pts
- Those that beat me 5 pts
- The top 2 players every week get 2 points each
- Last place -1 pt, and a song!!! (I'm not joking, I'm 100% serious)

Grade scale (pts):

A >=400  
400 > B+ >=350  
350 > B >= 325  
325 > C+ >= 300  
300 > C >= 275  
275 > D >= 250  
F < 250

- Grade posting: My graders do their best to return grades the following class.
- Grade grubbing: Consider a note along these lines: "Your final grade is not subject to negotiation. If you feel I have made an error, submit your written argument to me within one week of receiving your final grade. Clarify the precise error I made and provide all due supporting documentation. If I have made an error, I will gladly correct it. But I will adjust grades only if I have made an error. I cannot and will not adjust grades based on consequences, such as hurt pride, lost scholarships, lost tuition reimbursement, lost job opportunities, or dismissals. Do not ask me to do so. It is dishonest to attempt to influence faculty in an effort to obtain a grade that you did not earn, and it will not work."

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## COURSE SCHEDULE

**This Syllabus WILL change throughout the semester!!**

Topic
Introduction to Class software download
Compound return data containers control sequence functions uniroot Lab # 1: Calculate your education's compound return
Practice Set # 1 Quantmod Index ETF Lab # 2: SPY/Berkshire Hathaway compound return
Practice Set # 2 Passive Investing/Active Investing Value Investing Quantitative Screens Earnings Yield Ratio Lab # 3: Calculate EY for historical fundamental data
Practice Set # 2 Passive Investing/Active Investing Value Investing Quantitative Screens Earnings Yield Ratio

Lab # 3: Calculate EY for historical fundamental data
<b>Midterm # 1</b>
Practice Set # 3 Quantmod – getQuote() Lab # 4: Calculate EY strategies
Practice Set # 3 Quantmod – getQuote() Lab # 4: Calculate EY strategies
<b>NO CLASS!!!!</b>
Practice Set # 4 ROC ratio Lab # 5: Calculate ROC ratio for fundamental data
Practice Set # 4 ROC ratio Lab # 5: Calculate ROC ratio for fundamental data
Practice Set # 5 Lab # 6: ROC/EY strategy
<b>Midterm # 2</b>
Visualizing EY and ROC ratio using ggplot
Visualizing EY and ROC ratio using ggplot
<b>Final</b>

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## SUPPORT SERVICES

If you need accommodation for a ***disability***, obtain a Letter of Accommodation from the Office of Disability Services. The Office of Disability Services at Rutgers, The State University of New Jersey, provides student-centered and student-inclusive programming in compliance with the Americans with Disabilities Act of 1990, the Americans with Disabilities Act Amendments of 2008, Section 504 of the Rehabilitation Act of 1973, Section 508 of the Rehabilitation Act of 1998, and the New Jersey Law Against Discrimination. More information can be found at [ods.rutgers.edu](http://ods.rutgers.edu).

[Rutgers University-New Brunswick ODS phone (848)445-6800 or email [dsoffice@echo.rutgers.edu](mailto:dsoffice@echo.rutgers.edu)]

[Rutgers University-Newark ODS phone (973)353-5375 or email [ods@newark.rutgers.edu](mailto:ods@newark.rutgers.edu)]

If you are ***pregnant***, the Office of Title IX and ADA Compliance is available to assist with any concerns or potential accommodations related to pregnancy.

[Rutgers University-New Brunswick Title IX Coordinator phone (848)932-8200 or email [jackie.moran@rutgers.edu](mailto:jackie.moran@rutgers.edu)]

[Rutgers University-Newark Office of Title IX and ADA Compliance phone (973)353-1906 or email [TitleIX@newark.rutgers.edu](mailto>TitleIX@newark.rutgers.edu)]

If you seek ***religious accommodations***, the Office of the Dean of Students is available to verify absences for religious observance, as needed.

[Rutgers University-New Brunswick Dean of Students phone (848)932-2300 or email [deanofstudents@echo.rutgers.edu](mailto:deanofstudents@echo.rutgers.edu)]

[Rutgers University-Newark Dean of Students phone (973)353-5063 or email [DeanofStudents@newark.rutgers.edu](mailto:DeanofStudents@newark.rutgers.edu)]

If you have experienced any form of ***gender or sex-based discrimination or harassment***, including sexual assault, sexual harassment, relationship violence, or stalking, the Office for Violence Prevention and Victim Assistance provides help and support. More information can be found at <http://vpva.rutgers.edu/>.

[Rutgers University-New Brunswick incident report link: <http://studentconduct.rutgers.edu/concern/>. You may contact the Office for Violence Prevention and Victim Assistance at (848)932-1181]

[Rutgers University-Newark incident report link: [https://cm.maxient.com/reportingform.php?RutgersUniv&layout\\_id=7](https://cm.maxient.com/reportingform.php?RutgersUniv&layout_id=7) . You may also contact the Office of Title IX and ADA Compliance at (973)353-1906 or email at [TitleIX@newark.rutgers.edu](mailto:TitleIX@newark.rutgers.edu). If you wish to speak with a staff member who is confidential and does **not** have a reporting responsibility, you may contact the Office for Violence Prevention and Victim Assistance at (973)353-1918 or email [run.vpva@rutgers.edu](mailto:run.vpva@rutgers.edu)]

If students who have experienced a temporary condition or injury that is adversely affecting their ability to fully participate, you should submit a request via <https://temporaryconditions.rutgers.edu> .

If you are a military **veteran** or are on active military duty, you can obtain support through the Office of Veteran and Military Programs and Services. <http://veterans.rutgers.edu/>

If you are in need of ***mental health*** services, please use our readily available services.

[Rutgers University-Newark Counseling Center: <http://counseling.newark.rutgers.edu/>]

[Rutgers Counseling and Psychological Services–New Brunswick: <http://rhscaps.rutgers.edu/>]

If you are in need of ***physical health*** services, please use our readily available services.

[Rutgers Health Services – Newark: <http://health.newark.rutgers.edu/>]

[Rutgers Health Services – New Brunswick: <http://health.rutgers.edu/>]

If you are in need of **legal** services, please use our readily available services: <http://rusls.rutgers.edu/>

Students experiencing difficulty in courses due to ***English as a second language (ESL)*** should contact the Program in American Language Studies for supports.

[Rutgers–Newark: [PALS@newark.rutgers.edu](mailto:PALS@newark.rutgers.edu)]

[Rutgers–New Brunswick: [eslpals@english.rutgers.edu](mailto:eslpals@english.rutgers.edu)]

If you are in need of additional ***academic assistance***, please use our readily available services.

[Rutgers University-Newark Learning Center: <http://www.ncas.rutgers.edu/rLC>]

[Rutgers University-Newark Writing Center: <http://www.ncas.rutgers.edu/writingcenter>]

[Rutgers University-New Brunswick Learning Center: <https://rlc.rutgers.edu/>]

[Optional items that many faculty include:

- Students must sign, date, and return a statement declaring that they understand the RU Academic Integrity Policy.

- Students must sign, date, and return a statement declaring that they understand this syllabus.]