

RUTGERS UNIVERSITY
School of Business – Camden

FINANCIAL DATA ANALYTICS (53:390:581:90)
Online FALL 2022

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COURSE OBJECTIVES:

My mission and purpose for this course is to present the basic of financial data analytics tools in a clear, concise, and programmed manner that provides students opportunities to discover the various ways financial data analytics tools can enhance their personal and professional lives.

This course provides a broad and practical introduction to the modern methods of Financial Data analysis. The course emphasizes the use of modern analytical techniques to extract insights from the most commonly used financial data. Using a hands-on approach, you will develop deep practical intuition into the nature of financial returns, portfolio construction and management, bond and stock valuation, as well as options concepts. Using the R programming language you will build financial models using a mix of market and accounting information, build optimal portfolios, and learn the basics of risk management as well as more advanced concepts of options pricing.

REQUIRED TEXTBOOK:

- *Analyzing Financial Data and Implementing Financial Models Using R (SECOND EDITION)*. By Clifford S. Ang. Springer 2021(2nd edition). I recommend a [PDF version](#) since the Kindle version might have some formatting issues with formulas. The [book's website](#) offers the latest errata (list of typos) and some data. TIP: you might be able to get a PDF of the book for free through Rutgers Libraries (just log in and search for this book and then click on “online” version) to download the pdf version.

OTHER REQUIRED MATERIALS:

- **[THESE CAN BE OFFERED FOR FREE DURING DATACAMP'S PROMOTIONAL PERIODS: please check their website before buying]One month subscription to DATACAMP** – a premier source of learning for data science community. You will be required to complete two micro-courses on DataCamp in the first two weeks of the semester (you'll need to be logged in to access the links below):
 - [Introduction to R](#), and
 - [Introduction to R for Finance](#)

There is a lot of overlap between the two micro-courses but this will help reinforce the concepts successfully prepare you for the our main course material.

GOALS AND OBJECTIVES:

Basic fluency of R: Students will be able to

1. Differentiate between different forms of data (vectors, data frames, lists, etc.)
2. Manipulate data in R
3. Sub setting and expanding data in R

Understanding Prices and Returns: Students will be able to

1. Differentiate between total and price returns
2. Understand the difference between logarithmic and arithmetic returns
3. Calculate cumulative returns for weeks, months, and years.

Understand Portfolio Return Concepts: Students will be able to

1. Construct portfolio returns from individual asset returns
2. Construct benchmark portfolio returns

Understanding Risk and Risk adjusted performance: Students will be able to

1. Describe risk-return tradeoff
2. Estimate portfolio Risk with Value at Risk, Expected Shortfall and other measures.

Understand Factor Models and Markowitz Optimization Procedure: Students will be able to

1. Use the CAPM to estimate required returns
2. Find optimal portfolio weights using quadratic optimization procedure
3. Calculate the expected return and standard deviation of a two-asset portfolio

Understand Issues in Analyzing Fixed Income Data: Students will be able to

1. Understand the role of Treasury securities in Economic Analysis
2. Estimate the value of a bond portfolio

Understand Issues in Analyzing Options Data: Students will be able to

1. Use Black-Scholes and the Binomial Options pricing model to find the value of calls and puts
2. Differentiate between different Greeks
3. Calculate implied volatility and use it gauge market risk

TEACHING METHODS:

Given this is an online offering, you will be required to exhibit a higher than usual level of self-discipline in reading the assigned material, working any suggested questions, participating in discussion threads, and submitting required assignments. Time management is a key component to success in this type of course. With that in mind, I make the following recommendation.

If you have difficulty managing your own time, or if you require a teacher to constantly remind you what you need to do next, and when you have to do it, I urge you to rethink taking this course. If

you are taking this course because you believe it will be less demanding of your time, I highly recommend you rethink taking this class. Simply stated, if you have difficulty being self-motivated, or if you are trying to “slide in another 3 hours that won’t require much effort,” you should consider taking another section of the course. I want you to know that I make the above recommendation with the highest level of sincerity. I want this course to be a rewarding experience for you, not one of disappointment. There will be much to do in the course, so you will have to be on top of the clock at all times.

If the above does not scare you, and I hope it does not, and you are willing to work with the instructor and other classmates, you will increase your probability of success in the course.

What you will find in this course is a variety of pedagogical modalities. I am presenting some of the material using video, audio, some of the material will be found on provided web links, and of course, the assigned readings are in the textbooks. What I have tried to do is break the material into smaller chunks to ease consumption and enhance retention. I have also tried my best to break the material into weekly sections (Modules) that have logical break-points. I understand that some of the breaks may have better positioning than others, so I ask for your patience if you see a mis-placed ‘break.’

As indicated, I believe one of the best ways to succeed in this class, and to more effectively learn and retain information, is to consume topics in smaller chunks, and to be asked questions regarding the material frequently. Another way to succeed in this class, and to stay up-to-date with the material, is to have an idea of what a typical week in this class will entail.

You should feel free to contact me whenever a question arises. Although this is an asynchronous course, I am your Professor, which means I am here to help. Help me make this an enjoyable, as well as a rewarding educational experience for you.

Syllabus updates and other course communications:

All changes and announcements will be made through the course website. If you do not use your Rutgers email domain for your email address, please ensure that you forward messages to whatever email address you use. Extra readings will be posted on the course site. Make it a habit to check the course web site on a periodic basis—even if nothing specific is due. Feel free to contact the professor for whatever reason but use the course site as your main communication tool.

STUDENTS WITH DISABILITIES

Students who are seeking an accommodation because of a disability are directed to the website <http://learn.camden.rutgers.edu/disability/disabilities.html> or they can contact the Camden campus Disability Coordinator, Mr. Tim Pure at 856-225-6442, Armitage Hall Room 362. The email address is disabilityservices@camden.rutgers.edu. All contact will be considered confidential.

COURSE REQUIREMENTS:

WARNING: ITEMS SUBMITTED OR COMPLETED AFTER DUE DATES RESULT IN A 50% REDUCTION OF YOUR SCORE. PLEASE SUBMIT AND COMPLETE ITEMS ON OR BEFORE THEIR DUE DATES.

GOAL ATTAINMENT ASSESSMENT WEEKLY QUIZZES (Regular Weekly Quiz) (50% of Final Grade)

There will be weekly quizzes that test your comprehension of the topics covered during the previous week. You can take these quizzes any time after they are available, but they are due the following Mondays. Quizzes are either multiple-choice format or short answer/essays.

CLASS PARTICIPATION/THREADED DISCUSSIONS (25% of Final Grade)

Weekly discussion topics will be posted on the course site for discussion amongst you and your fellow classmates. Although the discussion topics connect to the material at hand, the focus of each topic will be from students’ experiences and perspectives. Discussion topics will not be testable directly but will pertain to testable items. The purpose of the discussions is to encourage an exchange of ideas within a multitude of class interaction. You will be required to contribute to the discussion by posting responses and by also formulating questions that continue the discussion into parallel directions. Fear not, class participation in an asynchronous online offering is measurable.

FINAL EXAM (25% of Total)

There will be a comprehensive final exam in this course. The format for the final will be the same as that associated with the goal attainment weekly quizzes.

GRADING:

For the assignment of final grades, the course requirements will be weighted approximately as follows:

Class Participation/Discussion Threads.....	25%
Goal Attainment Weekly Quizzes.....	50%
Final Exam.....	25%
90-100%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
Less than 70%	F

ACADEMIC INTEGRITY:

“Academic integrity requires that all academic work be wholly the product of an identified individual or individuals. Joint efforts are only legitimate when the assistance of others is explicitly acknowledged...The principles of academic integrity entail simple standards of honesty and truth. Each member of the university has a responsibility to uphold the standards of the community and to take action when others violate them...Students are responsible for knowing what the standards are and for adhering to them. Students should also bring any violations of which they are aware to the attention of their instructors.”[1] (<http://academicintegrity.rutgers.edu/academic-integrity-at-rutgers>)

Students are expected to know, understand and adhere to the policies on academic integrity outlined above. Procedures for violation of these policies outlined in the University Code of Academic Conduct will be followed. For more information regarding policies and procedures, see Rutgers Academic Integrity WEBSITE.