DSA-5047: Data Analytics for Finance

Spring 2025 | East West University

Course Syllabus

Disclaimer:
The content of this syllabus is subject to expansion, modification, or refinement throughout the semester to accommodate evolving course needs and industry advancements.

Instructor Information

Md. Shafiqul Islam (Islam, M.S.)

- **Fulbright Scholar**, Saunders College of Business, Rochester Institute of Technology (RIT), Rochester, USA.
- **Beta Gamma Sigma** Honor Society Inductee 2024, USA.
- **Senior Lecturer**, Department of Business Administration, East West University.
- **Awards and Recognitions:**
    - Inaugural **IDLC Finance Olympiad 2018 First Runner-Up**.
    - **Valedictorian** and **Two-Time Gold Medalist**, University of Dhaka.
    - Winner of a **National Public Speaking Competition**.

Research and Expertise:
Mr. Islam is an early-career researcher in accounting, finance, and development economics. His work has been published in leading journals in these fields. His current research focuses on **integrated thinking and reporting** within the corporate reporting ecosystem. His current Google Scholar citation count is around 220 (h index 6) with 12 peer-reviewed journal articles.

Teaching Philosophy:
Known for his innovative teaching methods, Mr. Islam is committed to creating an engaging and intellectually stimulating learning environment. He is passionate about empowering students with the skills and knowledge needed to excel in the fields of accounting, finance, and data analytics.

Contact Information

- **Email:** fbsshuvo@gmail.com
- **Zoom:** https://rit.zoom.us/j/6764859200

- **Office Hours:** By appointment (schedule via Gmail).

Course Description

In the modern financial landscape, data-driven decision-making and computational methodologies are paramount. This course, **Financial Analytics**, immerses students in the application of advanced data analytics techniques to solve complex financial problems. Through hands-on programming and analytical exercises, students will explore key areas such as **portfolio optimization**, **algorithmic trading**, **asset pricing models**, **risk management**, and **financial information extraction**.

While this is not a pure programming course, students will gain proficiency in writing functions and scripts using **R**, the industry-preferred language for financial analytics, and **Python**, a versatile tool for data science. The course will cover both **base R** (core language functionalities) and specialized R packages tailored for financial applications. Additionally, students will engage with real-world financial datasets extracted from platforms such as **Bloomberg**, **Yahoo Finance**, and the **SEC EDGAR database**.

Pre-requisites:
While there are no formal pre-requisites, this course is designed for students with a quantitative background. A foundational understanding of **calculus**, **linear algebra**, and **programming** is strongly recommended.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

1. **Programmatically solve financial problems** using **R**, **and Office 365**, leveraging their respective libraries, packages, and formulas.
2. **Manipulate and manage financial datasets** efficiently, including cleaning, transforming, and merging data from diverse sources.
3. **Apply statistical and econometric techniques** such as **Ordinary Least Squares (OLS) regression**, **logistic regression**, and **time-series analysis** to financial data.
4. **Develop computational models** for financial applications, including **portfolio optimization**, **asset valuation**, **algorithmic trading strategies**, and **risk assessment**.
5. **Extract and analyze financial data** from industry-standard platforms like **Bloomberg** and **SEC filings** to derive actionable insights.

Course Materials & Tools

1. **Textbooks:**
    - *R for Everyone: Advanced Analytics and Graphics* by Jared Lander (Addison-Wesley).

- *The Art of R Programming: A Tour of Statistical Software Design* by Norman Matloff (No Starch Press).
- *Investments* by Bodie, Kane, and Marcus (any edition, as core financial theories remain consistent).

2. **Software & Tools:**
   - **R** and **RStudio** for statistical computing and financial modeling.
   - **Microsoft Office 365** for data analysis, pre-processing, cleaning, and model building.
   - **Python** (via Jupyter Notebooks or IDEs like PyCharm) for supplementary data analysis tasks.
   - Access to **Bloomberg Terminal** (or equivalent) for financial data extraction.
3. **Hardware Requirements:**
   - A computer capable of running data-intensive applications (minimum 8GB RAM, multi-core processor).

Course Schedule

Week	Topics	Deliverables
1	Introduction to Financial Analytics	None
2	Introduction to R for Financial Analysis	None
3	R - Data Management Techniques	Quiz 1
4	Advanced R Programming for Finance	Quiz 2
5	Market Data: Extraction and Analysis	None
6	Portfolio Analysis I: Theory and Practice	None
7	Midterm Review and Exam	Exam 1
8	Portfolio Analysis II: Optimization	None
9	Algorithmic Trading I: Strategies	Assignment 1
10	Algorithmic Trading II: Backtesting	None
11	Options Pricing I: Models and Applications	None
12	Miscellaneous Topics (Online Work)	None
13	Options Pricing II: Advanced Techniques	Assignment 2
14	Text Mining for Financial Data	None
15	Final Exam Period	Exam 2

Grading

Component	Points
Assignments (2)	50
Quizzes (2)	10
Exam 1	15
Exam 2	20
Participation	5
Total	**100**

Grade Scheme

Numerical Grade	Letter Grade		Grade Point
80% and above	A+	(A Plus)	4.0
75% to less than 80%	A	(A Regular)	3.75
70% to less than 75%	A-	(A Minus)	3.5
65% to less than 70%	B+	(B Plus)	3.25
60% to less than 65%	B	(B Regular)	3.0
55% to less than 60%	B-	(B Minus)	2.75
50% to less than 55%	C+	(C Plus)	2.5
45% to less than 50%	C	(C Regular)	2.25
40% to less than 45%	D		2.0
Less than 40%	F		0.0
Incomplete	I		
Withdrawn	W		

Grading Policies

1. **Timely Submissions:**
    - Quizzes and exams are conducted in-class during scheduled times. Missing a quiz or exam without prior approval will result in a score of **zero**.
    - Assignments submitted up to **24 hours late** will incur penalties:
        - **<2 hours late:** 5% penalty.
        - **>2 hours but ≤24 hours late:** 10% penalty.
        - **>24 hours late:** Submissions will not be accepted, and a score of **zero** will be assigned.
2. **Specifications:**
    - Each deliverable (assignments, quizzes, exams) has clearly defined specifications, including format and submission requirements. Adherence to these specifications is mandatory.
3. **Documented Emergencies:**
    - In the event of a documented emergency (e.g., a medical emergency with official documentation), the instructor may, at their discretion, allow the student to make up missed points through an **extra assignment or exam** at the end of the course.