Course Description

This course provides an overview of Information System-based financial transaction systems and their role in portfolio selection for the Financial Sector. Topics include portfolio selection, rebalancing and performance monitoring from the standpoint of artificial intelligence learning techniques. This course covers stock selection/filtering, building robust scalable models, identifying statistical deviations, arbitrage market theories, managing risk and measuring the performance of various quant models.

Class Time

This class is offered asynchronously online. While you control when you watch videos and work on assignments, be aware of course pacing and specific deadlines.

Instructor Information

Dr. Robert P. Schumaker
Professor, Computer Science Dept.
rschumaker@uttyler.edu

Office Hours

Slack (preferred), Zoom, email

If your inquiry is grade-related, please make a Zoom or physical appointment

Textbook Information

If you are a beginner in financial investments and have the time this semester consider this companion book. Otherwise, this book is optional.
A Quantitative Primer on Investments with R (Rosenthal)
ISBN: 978-1-7322356-0-1

Required:
Reproducible Finance with R (Regenstein)
ISBN: 978-1-1384-8403-0

If you are advanced in financial investments and have the time this semester consider this companion book. Otherwise, this book is optional.
Applied Probabilistic Calculus for Financial Engineering (Chan)
ISBN: 978-1-119-38761-9

Course Objective

This course is designed with the following goals:

- Identify machine learning techniques for portfolio management
- Develop a repertoire of robust models for stock selection
- Recognize arbitrage opportunities in data, systems and environment
- Evaluate investment model performance

Computer Account Access

Students will need a Patriot account and password for computer access. This information can be found at `https://www.uttyler.edu/ccs`

Course Documents and Slides

This class will use Canvas for course documents, slides, quizzes and other class-related materials. Students are encouraged to check the website frequently during the course of the semester to keep up to date about course activity.

Course Grading

Course evaluation will be based on the following:

Quizzes (5 @ 20 points each)	100
Total Points	100

Grading Scale

A	85.0 points or more
B	70.0 to 84.999 points
C	55.0 to 69.999 points
D	40.0 to 54.999 points
F	39.999 points or less

Tentative Course Schedule and Assignments

Date	Concept	Readings	Assignments
May 5-11	Introduction to Quantitative Investing		
	Introduction to R	Ch 1	
May 12-18	Building a Portfolio	Ch 3	
	Asset Pricing and CAPM	Ch 2, 8	
May 19-25	Fama-French Factor Model	Ch 9	Quiz 1
	Portfolio Analysis: Fundamental vs Technical		
May 26-Jun 1	Portfolio Regression and Time-Series Analysis		Quiz 2
	Sectors, Industries, and Portfolio Rebalancing		
Jun 2-8	Risk-Return Tradeoff and the Sharpe Ratio	Ch 7	Quiz 3
	High-Frequency Trading (HFT)		
Jun 9-15	Technical Analysis for Intraday Trading		Quiz 4
	Machine Learning and Portfolio Management		
Jun 16-21	Monte Carlo Simulation for Investment Decisions	Ch 11	Quiz 5
	Cryptocurrency Analysis		