SCHACK INSTITUTE OF REAL ESTATE

Introduction to Real Estate
Data Analytics REDA1-CE1000

Fall 2020 Syllabus

Course Overview

Dates: November 2, 2020 – December 15, 2020
(Course closes December 17, 2020 at 5 PM Eastern)
Format: Online, self-paced

Instructor

Peter J Mattingly, M.S., M.A.
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Office Hours

Wednesdays, 6:00 - 7:00 PM Eastern via Zoom (details on Moodle)

Course Description

Real estate has become a sophisticated industry that now relies on advanced data analytics to drive investment and other critical decisions. This course is designed to give students an understanding of the techniques of data analysis used in the industry. Students will be exposed to hands-on examples of data analytics using data commonly seen in the industry. Applied statistics will be presented using the open-source R statistical computing environment. Immersion in data ingestion, transformation and visualization will be immediate. Students will gain real-world experience creating statistical analyses to drive informed decision-making in real estate investment decisions.

Course Prerequisites

None

Course Structure/Method

This course will employ an online lecture format. All required material will be covered in class. Students will complete assignments using the R statistical computing environment.

Course Learning Outcomes

By the end of the course, students will:

- Gain a deeper understanding of empirical finance;
- Gain an understanding of the power and the limitations of advanced analytics;
- Gain an understanding of common macroeconomic and industry data sources;
- Develop the ability to interpret and communicate statistical analyses; and,
- Develop statistical models to inform real estate decision-making.

Communication Policy

All course-related communication with the instructor will be through the instructor's NYU e-mail and will be answered within 36 hours, provided the NYU e-mail system is functioning.

Course Expectations

During the semester, students will be required to:

- Identify major sources of economic and real estate data
- Ingest and clean data
- Develop and interpret statistical models with potential real estate applications
- Synthesize the above with in-class presentations

Assignments

Assignments are meant to provide students with supplemental material to assist learning.

Assessment Strategy

Each week will consist of a self-paced two-hour lecture, followed by a one-hour assignment.

Final grades will be assigned as follows:

- Assignments 1 through 5 (Cumulative): (100%)

Grading Policy

Please be advised that this course is graded Pass/Fail. Students who participate in the course and complete the required assignments will receive a grade of "Pass". Those that do not will receive a grade of "Fail".

N Grades

Students who do not participate in the course nor request to participate will receive an "N" grade, meaning "No Grade/Unofficial Withdrawal".

Course Outline*

Week	Topic
Week 1 **November 2nd - 8th**	• R, R Studio, and R Markdown • Sourcing, wrangling, and visualizing economic and real estate data
	• Assignment 1 Posted
Week 2 **November 9th - 15th**	• Probability distribution, sampling, sample statistics, basic estimation • Classical hypothesis testing and null hypothesis
	• Assignment 1 Due (November 10, 11:59 PM Eastern) • Assignment 2 Posted
Week 3 **November 16th - 22nd**	• Classical hypothesis testing and null hypothesis • Central limit theorem • Causality
Week 4 **November 23rd - 29th**	• Introduction to regression using the capital asset pricing model (CAPM) • Linking regression and hypothesis testing using CAPM • Multiple applications of CAPM and other examples of bivariate regression, including an exploration of the Expectations Theory of interest rates
	• Assignment 2 Due (November 24, 11:59 PM Eastern) • Assignment 3 Posted
Week 5 **November 30th - December 6th**	• Continued discussion of causality • Multivariate regression and interpretation • Extension of CAPM to Fama-French factor models
	• Assignment 3 Due (December 1, 11:59 PM Eastern) • Assignment 4 Posted

Week	Topic
Week 6 **December 7th - 13th**	• Applications to residential real estate, graduate school admissions, and the returns to education • Classical assumptions in regression and implications of their violation, including omitted variable bias
	• Assignment 4 Due (December 8, 11:59 PM Eastern) • Assignment 5 Posted
Week 7 **December 14th - 15th**	• No new course material
	• Assignment 5 Due (December 15, 11:59 PM Eastern)

*Note that this syllabus is preliminary and subject to change. Please stay on top of all emails and NYU Classes notifications to be sure you are aware of class schedule changes.