Machine Learning for Finance

Perform advanced financial analysis with algorithms and statistical techniques

THE UNIVERSITY OF CHICAGO

Organizations are constantly trying to streamline processes, cut costs, and drive profitability. Data has become a key factor in producing better financial analytics, providing leaders with the insights they need to make strategic decisions.

Machine Learning for Finance

Financial analysts are responsible for assessing an organization's viability, stability, and financial health, making use of financial statements and leading industry tools and techniques.

With the rise of big data, organizations are now incorporating data-driven analysis to identify relevant financial trends, prepare insights, and summarize information for finance managers.

Course Details

Tuition: USD $2,800

Course Format: Online with live, interactive sessions

Duration: Eight weeks

Language: English and Spanish

Instructor: Lara Kattan, MPP, BA; Machine Learning for Finance, the University of Chicago

About the Course

Our eight-week Machine Learning for Finance course focuses on collecting, organizing, and using data to perform advanced financial analysis with algorithms and statistical techniques and tools. During the course, you will have an opportunity to work through real-life case studies and examples and practically apply theory to financial models.

You will learn to:

- Review statistics and probability and apply basic concepts of statistics to finance
- Understand what linear regression is and when to use it, as well as how to apply linear regression metrics to a model
- Make models more rigorous by adding things like train/test split and cross-validation
- Backtest a model and understand why this is particularly important for finance
- Use simulation to solve a portfolio allocation problem
- Converse at a high level about several advanced topics in financial machine learning

Techniques and Tools Covered:

Who Should Attend?

This course is designed for professionals who want to develop a career in the financial industry or in a finance-oriented role such as financial analyst, financial advisor, consultant, investment fund manager, portfolio manager, venture capital and private equity manager, or capital market professional. It is further aimed at decision makers like chief financial officers, financial controllers, risk managers, and business development managers, as well as fintech professionals and fintech entrepreneurs.

Meet Your Instructor

Lara Kattan is a data science educator and curriculum writer. She is currently developing curriculum for institutions such as the University of Chicago and data science learning startups. Prior to embarking on a career in curriculum development, she was a consultant in risk practice at McKinsey & Co. She has an MA in public policy with a concentration in econometrics from the University of Chicago and a BA in economics and political science from Northwestern. Kattan is a lifelong learner and is pursuing an MA in computer science and another in mathematics from DePaul University.

Lara Kattan, MPP, BA; Machine Learning for Finance, the University of Chicago

Why the University of Chicago?

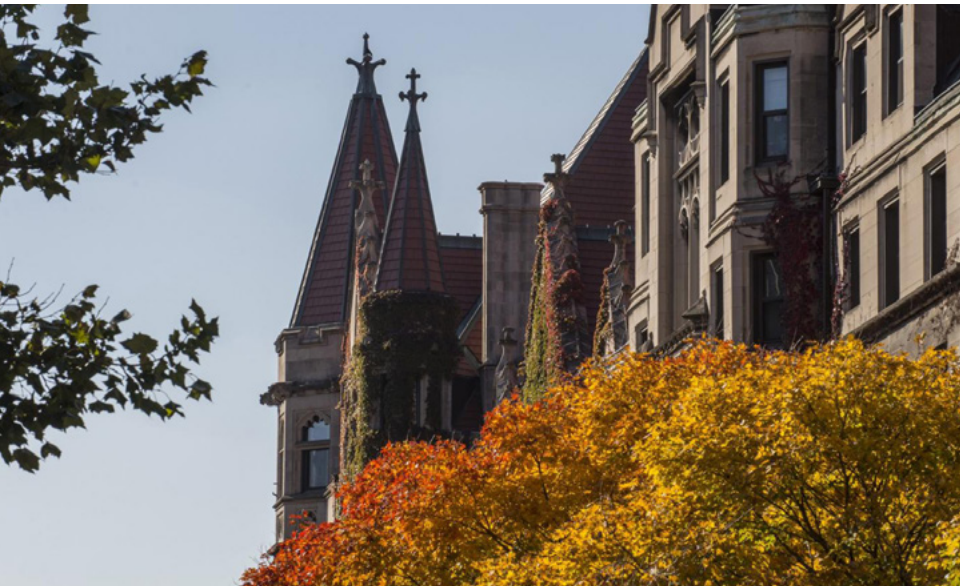
Becoming a member of the University of Chicago community means gaining access to world-class instructors and a cohort of curious, diverse individuals.

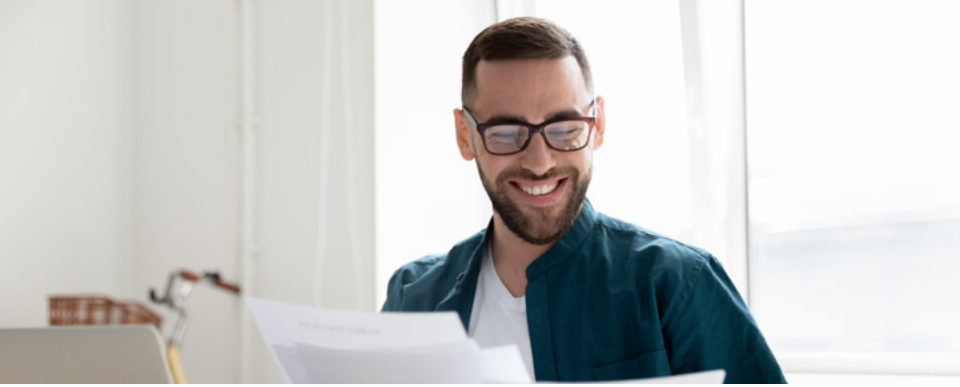
Through a firm grounding in core principles and a rigorous approach to problem-solving, our teaching method—the Chicago Approach—will give you the tools you need to make sense of complex data and turn ideas into impact.

Approach to Online Learning

Our online programs are crafted to support your specific professional development goals. Courses combine e-learning with live, interactive sessions to strengthen your skill set while maximizing your time. We couple academic theory and business knowledge with practical, real-world application.

Through online sessions, you will have an opportunity to interact with University of Chicago instructors and your peers.





Explore finance-applied machine learning with industry insiders

Today's businesses need data-based financial analysis to gain deeper insights that will enable them to connect operations to long-term value, model scenarios in real time, and allocate resources efficiently. The increasing demand for advanced finance functions and technological advancements in cloud-based services have led to the financial analytics market's significant growth.

$74k

is the average annual base pay for a financial analyst in the United States.

Source: Glassdoor

$43B

is the anticipated value of the financial analytics market by 2030.

Source: Global Market Insights

15%

is the projected CAGR of the financial analytics industry from 2022 to 2030.

Source: Global Market Insights

Potential Job Titles in Machine Learning for Finance

- Accountant
- Asset/Wealth Manager
- CFO
- Commercial Banker
- Economist
- Finance Manager
- Financial Advisor
- Financial Analyst
- Investment Banker

Weekly Schedule

The Machine Learning for Finance course covers the following topics:

Module 1: Statistics Review and Introduction to Python

- Introduction to probability
- Introduction to statistics
- Introduction to Python I
- Introduction to Python II
- Introduction to Python III
- Pandas

Module 2: Exploratory Data Analysis and Linear Regression

- Exploratory data analysis
- Linear regression
- OLS analysis
- Regression metrics

Module 3: Advanced Linear Regression and Model Building

- Bias-variance tradeoff
- Model testing
- Model validation
- Feature engineering
- Regularization

Module 4: Time Series Modeling

- Time series data
- Autoregressive model (AR)
- Moving average model (MA)
- The ARIMA model
- Working with time series data in Python

Module 5: Advanced Time Series

- GARCH/ARCH models
- Impremention of GARCH/ARCH
- Analyzing S&P 500 data

Module 6: Classification, Unsupervised Learning, and Ensemble Methods

- Supervised learning
- Classification algorithms: k-Nearest neighbors
- Classification algorithms: logistic regression
- Classification metrics
- Unsupervised learning
- Ensemble methods: bagging, random forests, and boosting

Module 7: Risk and Portfolio Selection

- Basics of risk and capital allocation
- Capital allocation: one risky and one risk-free asset
- One risky asset and one risk-free asset: example
- The consumer's preferences
- Risk aversion and utility values
- Expected return and variance on a portfolio of two risky assets
- Covariance and correlation
- A trip to Monte Carlo

Module 8: Advanced Concepts in Financial Analysis

- Neural networks: starting point
- Neural networks: activation functions, and vanishing gradients
- Big data
- Approaches to big data: Hadoop
- Approaches to big data: MapReduce, and Spark

Course outline may be subject to change based on academic adjustments.

Complement your studies:

If you would like to further your studies in finance, our ten-month Professional Certificate in Strategic Financial Management provides knowledge of financial topics, enabling you to implement this in your work environment.

Leverage the University of Chicago's leadership in the financial sector and enhance your studies in areas such as Corporate Financial Strategy, Decision-Making and Risk Management, FinTech and the Psychology of Finance.

Learn more

To schedule an appointment with admissions, contact **admissions@online.professional.uchicago.edu** or alternatively you can let us know when we can call you **here**.

Visit **online.professional.uchicago.edu** to learn more.