School of
Management and Law

Machine Learning for Advanced Portfolio and Risk Management

Certificate of Advanced Studies (CAS)

AACSB ACCREDITED

EQUIS ACCREDITED

ASSOCIATION OF MBAS ACCREDITED

Program

Supercharge your portfolio management with machine learning

Step out of your comfort zone – turn innovation into action with hands-on tools to transform how you manage portfolios and risk.

CONTEXT AND RELEVANCE

Will your approach to data let new technologies such as machine learning (ML) and artificial intelligence (AI) pass you by, or will you actively use them to shape decisions and strategies? Are your investment processes stuck in familiar routines, or are they evolving toward automated analysis, data-driven forecasts, and new opportunities? The changes in the financial sector are significant and require professionals to understand both the potential and the limits of these technologies. With the right knowledge, you and your organization can put ML and AI to work effectively.

In this CAS, you will build a clear understanding of the core concepts of ML and AI in finance by focusing on real use cases and hands-on implementation. The first module refreshes essential programming and quantitative skills before moving quickly into financial applications and the main ideas of ML. The second module explores advanced approaches such as reinforcement learning, natural language processing, and agentic AI, showing how they can be applied to portfolio construction and risk management.

Here, we tackle the core challenges of modern asset management and show how ML builds a stronger foundation for real-world decisions.

LEARNING OBJECTIVES AND BENEFITS

As a participant of this CAS, you will:

- develop an intuitive understanding of ML and AI for financial applications,
- gain hands-on experience with ML methods in portfolio construction, risk modeling, and trade execution,
- explore advanced techniques like reinforcement learning, natural language processing, and agentic AI to stay ahead in modern asset management.

TARGET AUDIENCE

The program is designed for:

- finance professionals – analysts, advisors, and managers – looking to apply ML tools in daily decision-making,
- consultants aiming to better support financial clients through ML insight and strategy,
- career changers from other sectors who want to gain data-driven skills for asset and risk management,
- technology experts in finance seeking to bridge the gap between ML models and investment objectives.

METHODOLOGY

This CAS is built on real-world learning – not abstract theory. All instructors combine deep academic knowledge with hands-on financial experience.

You'll learn through:

- interactive lectures focused on real finance challenges,
- hands-on mini-labs and workshops using financial data,
- case studies inspired by asset management, trading, and risk problems,
- individual and group projects that turn concepts into solutions.

Every session is designed to apply ML tools directly to investment and risk use cases – bridging theory with execution.

Structure and Content

Bridging academia and real-world applications

Apply the power of machine learning to real-world finance and make smarter investment decisions.

MODULE OVERVIEW

MODULE 1 6 ECTS credits	**MODULE 2** 6 ECTS credits
Foundations of ML in Finance	**Advanced ML Applications**
Python and Data Foundations – Programming essentials and data handling – Time series data structuring – Exploratory analysis **Data Preparation and Feature Development** – Data cleaning and transformation – Feature engineering – Probability theory fundamentals **Modeling and Validation** – Building baseline predictive ML models – Model evaluation and time series cross-validation **Portfolio Signals and Evaluation** – Signal generation and portfolio optimization – Portfolio construction principles and backtesting	**Advanced ML for Portfolio Management** – Predictive modeling and feature selection – Reinforcement learning for allocation and rebalancing – Integration with portfolio optimization **Agentic AI for Portfolio Management** – NLP modeling for stock selection – AI-assisted research and decision support – Text and data integration for signals and reporting **Execution and Market Microstructure** – Order execution and transaction costs – Market impact, liquidity, and slippage **Risk and Scenario Analysis** – Risk measurement and monitoring – Regime awareness and robustness
Assessment 1: Quiz	**Assessment 2: Final Project and Quiz**

INSTRUCTORS

– Lecturers from the ZHAW School of Management and Law with research backgrounds and proven practical experience in the financial industry in quantitative roles
– Senior practitioners with a track record in quantitative investing, risk management, data-driven decision-making, and strong teaching experience

For more information, please refer to our CAS webpage:
>>> **www.zhaw.ch/iwa/casmlrm**

Contact

We would be delighted to assist you in a personal consultation

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About Us

INSTITUTE FOR WEALTH & ASSET MANAGEMENT (IWA)

The IWA represents the ZHAW School of Management and Law in the strategic banking sector, providing targeted contributions in education, professional development, research, and services to qualify professionals and leaders in the finance industry. We collaborate with various domestic and international institutions in both research and business sectors. Addressing challenges related to transformation and innovation in the financial services industry is a key focus of our activities.

>>> **www.zhaw.ch/iwa**

Organizational Information

The prerequisites for your success

Visit us online for more information.

ADMISSION REQUIREMENTS

Applicants must be graduates of universities or universities of applied sciences with a minimum of three years of relevant work experience. Candidates without a degree may be considered if they have at least five years of relevant professional experience and appropriate qualifications (higher vocational school or higher professional examination with a federal diploma). Final admission will be at the discretion of the program directors.

APPLICATION PROCESS

Applications for the program are submitted online. They will be processed in the order received.
››› www.zhaw.ch/iwa/casmlrm

PARTICIPANT LIMIT

The program is limited to a maximum of 24 participants.

SCHEDULE

Course dates are published online:
››› www.zhaw.ch/iwa/casmlrm

WORKLOAD

Participants will earn 12 ECTS credits (European Credit Transfer System) upon successful completion. Each credit corresponds to approximately 25 hours of work, totaling around 300 hours for the entire program. Many sessions will require preparation and follow-up work.

PERFORMANCE ASSESSMENT

Throughout the semester, students will complete assignments and short quizzes to reinforce their understanding, though these will not count toward the grade. Module 1 concludes with a comprehensive quiz, while Module 2 wraps up with a project and an additional quiz.

LOCATION

Classes are held at the ZHAW School of Management and Law (SML) in Zurich and/or Winterthur. Some training days may be offered in a hybrid format and can be attended online upon request. Changes to the location and format of the classes are possible.

DURATION

The program is designed to be completed over approximately five months while working.

CLASS SCHEDULE

Classes typically take place in blocks on Fridays, with occasional Wednesday evening sessions in various configurations. Changes to the schedule may occur.

LANGUAGE OF INSTRUCTION

The language of instruction is English. Course materials are available in English.

CERTIFICATION

Upon successful completion of the assessments and meeting an attendance requirement of at least 80 percent (of which a maximum of 20 percent may be online on selected days with prior approval from the program directors), participants will receive the “Certificate of Advanced Studies ZHAW in Machine Learning for Advanced Portfolio and Risk Management”.

COSTS

The course fee is CHF 8,500 per person. This includes all course materials.

PARTICIPATION CONDITIONS

The general participation conditions for executive education events can be found at: ››› www.zhaw.ch/sml/atb-wb

Zurich University
of Applied Sciences

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Management and Law**

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TRIPLE CROWN

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Issue date: September 2025 / Errors and omissions excepted