

COURSE SYLLABUS

Machine Learning in Finance, 5 credits

Machine Learning in Finance, 5 högskolepoäng

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| Course Code: J2MLIF | Education Cycle: Second-cycle level |
| Confirmed: Mar 25, 2026 | Disciplinary domain: Social sciences (75%) and Natural sciences (25%) |
| Valid From: Aug 31, 2026 | Subject group: Business Administration |
| | Specialised in: A1N Second cycle, has only first-cycle course/s as entry requirements |
| | Main field of study: Business Administration, Economics |

Intended Learning Outcomes (ILO)

On completion of the course you will be able to:

Knowledge and Understanding

2.2 Critically analyse complex issues using theories and data and justifying solutions with rigorous, evidence-based reasoning.

2.4 Critically assess the reliability of, and ethical implications arising from, the methods, tools, and techniques used to generate insights from data.

3.1 Produce well-structured, professional materials that demonstrate academic proficiency and adapt style and terminology to the target audience.

Judgement and Approach

5.2 Appraise relevant emerging trends and technologies to formulate strategies and decisions for applying innovations in practice or in advanced problem solving.

Content

This course introduces you to data-intensive and computational approaches to financial analysis using the Python programming language. The course aims to showcase you the new possibilities non-linear machine learning methods offer for financial analysis, as well as their caveats, hence supporting you in a career in finance. You will learn to apply machine learning methods to complex datasets, complementing traditional econometric approaches with non-linear data-driven tools. You will learn to master the full pipeline of machine learning-based analysis, including data handling, data preprocessing, feature engineering, supervised and unsupervised learning, model calibration and validation, as well as back-testing. In the course, you will use all the key ML models, including the recent foundational models based on generative AI. The built models are interpreted using explainable AI tools. The course also introduces you to the analysis of unstructured data (for example, natural language processing), causal machine learning, and machine learning-based simulations. Applications are drawn from a broad range of finance and business topics.

Connection to Research

The course is research-linked in several ways. First, it introduces you to computational and empirical methods that are increasingly used in contemporary finance research, including prediction-oriented modelling, reproducible workflows, and the critical evaluation of model performance. You work with a wide range of datasets and analytical tasks that resemble those used in academic studies of finance. Second, the course strengthens your methodological capabilities relevant for thesis work and advanced empirical finance courses by combining programming, data handling, and model evaluation in a structured workflow.

Third, the course introduces you to current research examples in finance, including research themes represented at JIBS.

Connection to Practice

The course is strongly practice-oriented. You work hands-on with realistic financial datasets and complete tasks that resemble analytical work in finance industry. These tasks include preparing financial data, building predictive models, evaluating out-of-sample performance, interpreting model outputs, and communicating results for decision-making. The emphasis on reproducible coding workflows, critical model validation, and structured problem-solving mirrors professional practice in data-driven finance. The course therefore supports your employability in roles that require analytical reasoning, quantitative modelling, and practical data capability.

Connection to Ethics, Responsibility, Sustainability (ERS)

Ethics, responsibility, and sustainability are embedded in the course through content. You are expected to reflect on data quality, transparency, reproducibility, and the responsible interpretation and use of machine learning models in finance. The course addresses ethical risks such as biased data, overfitting, opaque models, misleading performance claims, automation without sufficient oversight, and the responsible use of generative AI and other digital tools.

Type of Instruction

The course is taught on campus through lectures, computer labs, workshops, and seminars. It includes both individual and group-based learning activities. Teaching emphasises learning by doing with guided exercises. Active participation is expected throughout the course, and attendance may be compulsory in selected workshops, presentations, or other examinable sessions.

Attendance is expected for scheduled on-campus sessions and may be compulsory for some sessions.

Language of instruction is English.

Entry Requirements

The applicant must hold a minimum of a Bachelor's degree (equivalent to 180 ECTS credits from an accredited university), including at least 30 ECTS credits in Business Administration, of which at least 15 ECTS must be finance and/or accounting. Also, the applicant must have passed at least 10 ECTS in statistics, mathematics, econometrics, or the equivalent. Proof of English proficiency is required.

Examination and Grades

The course is graded A, B, C, D, E, FX or F.

The ILOs are assessed through the following examination forms:

Group assignments (ILOs: 2.2, 3.1), representing 2 credits. Weekly applied group assignments consisting of written and oral parts.

Individual project work (ILOs: 2.2, 2.4, 3.1, 5.2), representing 3 credits. A written project work.

All parts of the compulsory examination in the course must receive a passing grade before a final grade can be set. Grades are set in accordance with JIBS grading policy.

Registration of examination:

| Name of the Test | Value | Grading |
|--------------------------------------|-----------|----------------|
| Group assignments | 2 credits | G/U |
| Individual project work ¹ | 3 credits | A/B/C/D/E/FX/F |

¹Determines the final grade of the course, which is issued only when all course units have been passed.

Course Evaluation

The course evaluation is important for the continuous improvement of JIBS' courses and degree programmes. The examiner is responsible for ensuring that each course is evaluated, but as a student you are essential in this process. We rely on your input to understand how we can improve. At the outset of a course the student representatives are identified. In the middle of the course there should be an opportunity for the student representatives (or a larger group of students) to share reflections on how the course is progressing. At the end of the course, you will get a course evaluation survey to fill in. The examiner will then host a debrief meeting with the student representatives to discuss improvement opportunities, based on the course evaluation data and comments.

Other Information

As a JIBS student, you are expected to maintain strong academic integrity. You must act within the boundaries of academic rules and expectations relating to all types of teaching and examination.

Copying someone else's work is a particularly serious offence and can lead to disciplinary action. When you use someone else's work without proper citation or transparency about where it came from, you are committing plagiarism. Cutting and pasting without clearly acknowledging the original source is a textbook example of plagiarism.

You must also act responsibly when using Generative AI tools. Acting responsibly includes staying informed about the school's AI-policy, understanding what rules apply in each course, and properly declaring or disclaiming any use of generative AI. You are accountable for all content you submit, including AI-assisted material. Using AI without disclosure or beyond what is allowed in a course is a violation of academic integrity and will be subject to the same academic consequences as other forms of misconduct, which may include failing the assignment, failing the course, or further disciplinary action according to school policy.

The Jönköping University library offers online and in-person support for assisting you in identifying relevant sources, using and referencing literature, and creating texts that meet academic standards and integrity.

Other forms of academic misconduct include (but are not limited to) adding your name to a project you did not contribute to (or allowing someone to add their name), cheating during an examination, helping other students to cheat or submitting other students' work as your own, and using non-allowed electronic equipment during an examination. All such actions may result in disciplinary measures.

Course Literature

Please note that the course literature may be revised up to eight weeks before the start of the course.

Course literature will be provided upon course start