Syllabus

Course Description

Course Title	AI and Computational Methods for Accounting and Finance
Course Code	25462
Course Title Additional	
Scientific-Disciplinary Sector	
Language	English
Degree Course	Master in Accounting and Finance
Other Degree Courses (Loaned)	
Lecturers	Dr. Olga Stanislavovna Bogachek, Olga.Bogachek@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/41225 Dr. Paolo Coletti, Paolo.Coletti@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/6359
Teaching Assistant	
Semester	Second semester
Course Year/s	1
CP	6
Teaching Hours	48 (24+24)
Lab Hours	-
Individual Study Hours	-
Planned Office Hours	18 (9+9)
Contents Summary	AI and Computational Methods for Accounting and Finance This course introduces students to artificial intelligence (AI) and computational methods with applications in finance and accounting. The course is structured in two modules. M1 – Financial Analytics with AI covers practical programming skills

	and the use of AI tools for financial applications, including an introduction to blockchain and cryptocurrency. M2 – Blockchain, AI and Textual Methods examines how emerging technologies (predictive analytics, fraud and audit analytics, natural language processing, generative AI and blockchain) are reshaping accounting, auditing and finance. Students gain enough technical grounding to evaluate these tools critically. Through real-firm cases, they analyze how organizations adopt these technologies to address business problems and what adoption means for competitive advantage, governance and internal control, regulatory compliance, ethics and organizational change across jurisdictions.
Course Topics	Module 1 – Financial Analytics with AI • Introduction to Python and data structures for financial data (pandas) • Data acquisition, cleaning and exploratory analysis of large financial datasets • Financial modelling and trend forecasting with Python • Interaction with large language models (LLMs) and generative AI for financial analysis • Introduction to blockchain technology and cryptocurrencies Module 2 – Blockchain, AI and Textual Methods • Technology strategy in accounting and finance: when technology creates competitive advantage, and how it is transforming finance functions and audit firms • Prediction and classification for business decisions: regression-based and flexible models (polynomial, step, spline, local regression, GAMs), restatement prediction etc • Fraud risk analytics: logistic regression, Benford's Law, quadrophobia, and the costs and ethics of flagging • Audit analytics and internal controls: anomaly detection in ERP data, continuous auditing, dimensionality reduction (PCA and related techniques), and the transformation of audit practice • Textual analysis of corporate disclosures: NLP and topic modelling for firms, investors, regulators and competitive intelligence • Generative AI in accounting and finance: use cases, automated topic labelling, AI-assisted analysis, and AI governance, risk and regulation • Blockchain in accounting and finance: key concepts,

	governance, supply chain and financial applications and case discussions, and regulation across jurisdictions
Keywords	artificial intelligence, machine learning, Python, blockchain, cryptocurrency, natural language processing, fraud analytics, audit analytics, statistical methods
Recommended Prerequisites	Students are expected to have basic familiarity with: • Introductory statistics (descriptive statistics, hypothesis testing, basic regression) • Financial accounting fundamentals • Basic spreadsheet skills (Excel or equivalent) • English reading and comprehension at level B2 or above Prior basic programming experience is beneficial but not required for Module 1. No programming background is assumed for Module 2.
Propaedeutic Courses	
Teaching Format	M1 - Frontal lectures in standard classroom with examples and exercises. Students attend with their own notebook or a computer borrowed from the library and interact with LLM in their own way. Homework is assigned and corrected in the next lesson. Final mock-up exams are done together in the last lessons. M2 - A combination of lectures, data-driven case discussions, and guided empirical exercises. Real-world accounting and auditing datasets are used to illustrate methods. Guest practitioner presentations and discussion of academic research papers may be incorporated. Both modules encourage active participation. Students are expected to review assigned material prior to class and engage critically with examples and cases.
Mandatory Attendance	Regular attendance is suggested, but not required
Specific Educational Objectives and Learning Outcomes	ILO (Intended Learning Outcomes) ILO 1 – Knowledge and Understanding ILO 1.1 knowledge and understanding of economic and financial communication directed at stakeholders at both national and international level ILO 1.2 knowledge and understanding of economic and business models and performance measurement for planning and

	management control, as well as of models and methods of internal and external auditing ILO 1.3 knowledge and understanding of the planning and evaluation of new investments from an economic and financial perspective ILO 1.4 knowledge and understanding of the fundamentals of corporate finance for the correct application, for example, of decision-making models and of financial data and risk management in treasury management ILO 1.5 knowledge and understanding of economic and business models and tools for the management of firms, both family-owned or small-sized enterprises and internationally operating companies ILO 1.6 knowledge and understanding of the design and management of institutional and organisational structures related to corporate governance systems ILO 1.7 knowledge and understanding of business tools and processes developed to recognise, understand and drive change and to manage the impact of transitions on organisations ILO 1.8 knowledge and understanding of strategies for effective communication within organisations and towards different stakeholders ILO 1.9 knowledge and understanding of management topics characterising the profession of financial analyst, portfolio manager, risk manager and consultant ILO 1.10 knowledge and understanding of basic forecasting models to carry out integrated economic and financial analyses, also using econometric methods for time series and multivariate analysis ILO 1.11 knowledge and understanding of Big Data analysis techniques to support and integrate business decision-making processes ILO 2 – Applying Knowledge and Understanding ILO 2.1 ability to develop and integrate the results of economic and financial communication into business decision-making models ILO 2.2 ability to design and manage corporate restructuring processes and other extraordinary transactions ILO 2.3 ability to identify, evaluate and manage investments in financial markets ILO 2.4 ability to design coherent financial management strategies

	in firms or financial intermediaries, competently applying acquired knowledge in risk management techniques, asset valuation and derivatives ILO 2.5 ability to understand the evolution of financial markets and changes in the international macroeconomic context ILO 2.6 ability to analyse economic, managerial and financial variables in support of decision-making in firms and financial intermediaries ILO 2.7 ability to frame and critically evaluate situations and problems on the basis of scientific methods from a multidisciplinary perspective, thanks to training that integrates business, economic, legal, financial and statistical-mathematical disciplines ILO 3 – Making Judgements ILO 3.1 ability to apply acquired knowledge to make managerial and operational decisions and to solve administration and finance problems of firms, intermediaries and financial markets, jointly considering multiple analytical perspectives, including economic, legal, financial, strategic and managerial perspectives ILO 3.2 ability to select data and use appropriate information to describe problems related to the management of firms, intermediaries and financial markets ILO 3.3 ability to relate models and empirical evidence in the study of firms, intermediaries and financial markets ILO 4 – Communication Skills ILO 4 ability to communicate effectively, both orally and in writing, the specialised contents of individual disciplines, using different registers depending on the audience and communicative or educational objectives, and to assess the educational impact of such communication ILO 5 – Learning Skills ILO 5.1 ability to identify thematic connections and establish relationships between different cases and analytical contexts ILO 5.2 ability to frame new problems in a systematic way and to generate appropriate taxonomies

	ILO 5.3 ability to develop general models starting from the phenomena analysed
Specific Educational Objectives and Learning Outcomes (additional info.)	Knowledge and understanding: Students will develop a working knowledge of modern AI and computational methods as applied in accounting and finance, including both the theoretical underpinnings and practical implementation. They will understand how these methods are used in academic research and professional practice. Applying knowledge and making judgements: Students will be able to conduct end-to-end empirical analyses — from data collection and preparation to model estimation, interpretation and presentation. They will develop the critical capacity to identify appropriate methods for specific problems and to evaluate the quality and limitations of results. Communication and learning skills: Students will be able to communicate analytical findings effectively, both in oral presentations and written reports. They will also build the self-directed learning skills necessary to keep pace with rapidly evolving AI and data science tools.
Assessment	Module 1 – Financial Analytics with AI (50%): 42% Assessment based on a practical examination involving Python programming for financial data analysis (including interaction with generative AI tools), 8% a written component on blockchain technology. Module 2 – Blockchain, AI and Textual Methods (50%): Assessment based on a combination of participation in case discussions, written assignments and/or a final examination. For attending students, the final grade will be a mixture of participation in case study discussions/presentations/written works and mid-term assignments and exam(s) (ILOs 1-5). For non-attending students: written final exam (100%) (ILO 1-5). Detailed point breakdown for individual assignments and exam modalities will be provided in the first lecture.
Evaluation Criteria	Grading reflects the quality of analytical reasoning, the correctness and efficiency of technical implementations, and the ability to interpret and communicate results clearly. Specific rubrics for each assessment component will be distributed at the beginning of the course prior to the relevant assignment. Grading weights will reflect the amount of class hours dedicated to each topic and will be communicated at the beginning of the course.

	For Module 1, particular weight is given to solutions that are optimal, versatile and well-documented. Errors traceable to unchecked AI-generated output are taken into account in the evaluation. For Module 2, analytical rigour, correct application of statistical methods, and critical interpretation of results are emphasized.
Required Readings	**Module 1 –** Video lectures on Python programming for financial data analysis and on blockchain technology, available via the instructor page (will be provided). **Module 2 –** Lecture slides and supporting materials provided by the instructor. Selected academic papers and practitioner readings distributed during the course. No single textbook is required; a reading list will be provided at the start of the module.
Supplementary Readings	Course materials may draw on three areas: (i) lecture slides provided by instructors; (ii) selected academic papers from leading accounting, finance and information systems journals; and (iii) publicly available datasets, case studies and online resources. Specific references will be provided during the course.
Further Information	
Sustainable Development Goals (SDGs)	Quality education

Course Module

Course Constituent Title	Financial analytics with AI
Course Code	25462A
Scientific-Disciplinary Sector	NN
Language	English
Lecturers	Dr. Paolo Coletti, Paolo.Coletti@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/6359
Teaching Assistant	
Semester	Second semester

CP	3
Responsible Lecturer	
Teaching Hours	24
Lab Hours	-
Individual Study Hours	-
Planned Office Hours	9
Contents Summary	Financial Analytics with AI covers practical programming skills and the use of AI tools for financial applications, including an introduction to blockchain and cryptocurrency
Course Topics	Module 1 – Financial Analytics with AI • Introduction to Python and data structures for financial data (pandas) • Data acquisition, cleaning and exploratory analysis of large financial datasets • Financial modelling and trend forecasting with Python • Interaction with large language models (LLMs) and generative AI for financial analysis • Introduction to blockchain technology and cryptocurrencies
Teaching Format	M1 - Frontal lectures in standard classroom with examples and exercises. Students attend with their own notebook or a computer borrowed from the library and interact with LLM in their own way. Homework is assigned and corrected in the next lesson. Final mock-up exams are done together in the last lessons.
Required Readings	**Module 1 –** Video lectures on Python programming for financial data analysis and on blockchain technology, available via the instructor page (will be provided).
Supplementary Readings	

Course Module

Course Constituent Title	Blockchain, AI and Textual Methods
Course Code	25462B
Scientific-Disciplinary Sector	ECON-06/A
Language	English
Lecturers	Dr. Olga Stanislavovna Bogachek, Olga.Bogachek@unibz.it

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Teaching Assistant	
Semester	Second semester
CP	3
Responsible Lecturer	
Teaching Hours	24
Lab Hours	-
Individual Study Hours	-
Planned Office Hours	9
Contents Summary	Blockchain, AI and Textual Methods examines how emerging technologies (predictive analytics, fraud and audit analytics, natural language processing, generative AI and blockchain) are reshaping accounting, auditing and finance. Students gain enough technical grounding to evaluate these tools critically. Through real-firm cases, they analyze how organizations adopt these technologies to address business problems and what adoption means for competitive advantage, governance and internal control, regulatory compliance, ethics and organizational change across jurisdictions.
Course Topics	Module 2 – Blockchain, AI and Textual Methods • Technology strategy in accounting and finance: when technology creates competitive advantage, and how it is transforming finance functions and audit firms • Prediction and classification for business decisions: regression-based and flexible models (polynomial, step, spline, local regression, GAMs), restatement prediction etc • Fraud risk analytics: logistic regression, Benford's Law, quadrophobia, and the costs and ethics of flagging • Audit analytics and internal controls: anomaly detection in ERP data, continuous auditing, dimensionality reduction (PCA and related techniques), and the transformation of audit practice • Textual analysis of corporate disclosures: NLP and topic modelling for firms, investors, regulators and competitive intelligence • Generative AI in accounting and finance: use cases, automated topic labelling, AI-assisted analysis, and AI governance, risk and

	regulation • Blockchain in accounting and finance: key concepts, governance, supply chain and financial applications and case discussions, and regulation across jurisdictions
Teaching Format	M2 - A combination of lectures, data-driven case discussions, and guided empirical exercises. Real-world accounting and auditing datasets are used to illustrate methods. Guest practitioner presentations and discussion of academic research papers may be incorporated. Both modules encourage active participation. Students are expected to review assigned material prior to class and engage critically with examples and cases.
Required Readings	**Module 2 –** Lecture slides and supporting materials provided by the instructor. Selected academic papers and practitioner readings distributed during the course. No single textbook is required; a reading list will be provided at the start of the module.
Supplementary Readings	Course materials may draw on three areas: (i) lecture slides provided by instructors; (ii) selected academic papers from leading accounting, finance and information systems journals; and (iii) publicly available datasets, case studies and online resources. Specific references will be provided during the course.