Zagadnienia odpowiadają programom studiów I stopnia z r.ak. 2022/23 oraz programom studiów II stopnia z r.ak. 2023/24 bo te roczniki bronią się wg planu w r.ak. 2024/25 lub później.
Please note that the topics correspond to AY 2022/23 1st cycle study programmes and AY 2023/24 2nd cycle study programmes since according to the study plan these students will be defending their theses in AY 2024/25 or later.

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Stopień / Cycle	Jęz. / Lang.	Przedmiot / Course	Liczba zagadnień / Number of topics	QF	Zagadnienia / Topics
II	ENG	Advanced Macroeconomics	3	x	Financial frictions
II	ENG	Advanced Macroeconomics	3	x	Monetary models
II	ENG	Advanced Macroeconomics	3	x	Real business cycles model
II	ENG	Statistics&Econometrics	3	x	Types of descriptive statistics and their role in data analysis
II	ENG	Statistics&Econometrics	3	x	Central Limit Theorem and normality assumption in statistical testing
II	ENG	Statistics&Econometrics	3	x	Diagnostics in the simple linear regression model
II	ENG	Introduction to Quantitative Finance	2	x	Efficiency of financial markets: the concept and its empirical testing
II	ENG	Introduction to Quantitative Finance	2	x	Risk and return principles: the Markowitz framework
II	ENG	Mathematical Methods in Finance	3	x	Non-linear Optimization and Optimal Control in Economic Models
II	ENG	Mathematical Methods in Finance	3	x	Dynamic Systems in Economics: Differential and Difference Equations
II	ENG	Mathematical Methods in Finance	3	x	Dynamic Programming and Stochastic Processes in Economic Analysis
II	ENG	Time Series Analysis	6	x	Definition and testing for stationarity of time series
II	ENG	Time Series Analysis	6	x	Univariate time series modelling: AR, MA, ARMA, ARIMA, SARIMA
II	ENG	Time Series Analysis	6	x	Definition and testing for cointegration of time series
II	ENG	Time Series Analysis	6	x	Error Correction Mechanism
II	ENG	Time Series Analysis	6	x	Multivariate time series modelling: VAR, VECM
II	ENG	Time Series Analysis	6	x	Modelling volatility in time series, GARCH-family models
II	ENG	Quantitative Strategies	6	x	Statistical and econometric foundations of the common types of trading strategies
II	ENG	Quantitative Strategies	6	x	Mean-reverting, momentum strategies and pair trading
II	ENG	Quantitative Strategies	6	x	Building an automated strategy – study of entries and exits
II	ENG	Quantitative Strategies	6	x	Backtesting and evaluating performance of the trading strategy and related biases
II	ENG	Quantitative Strategies	6	x	Statistical arbitrage strategies
II	ENG	Quantitative Strategies	6	x	Event arbitrage strategies
II	ENG	Financial Statement Analysis	6	x	Financial reporting standards
II	ENG	Financial Statement Analysis	6	x	Structure and components of the balance sheet, measurement bases for assets and liabilities, components of equity
II	ENG	Financial Statement Analysis	6	x	Cash flow statement: components, classification of cash flows, methods of cash flow statement preparation
II	ENG	Financial Statement Analysis	6	x	Financial analysis techinques: objectives, tools and techniques
II	ENG	Financial Statement Analysis	6	x	Statement of changes in shareholders' equity and Additional information: structure, components, and usefulness.
II	ENG	Financial Statement Analysis	6	x	Income statement: basic principles, recognition of revenue and expenses, calculation of earnings per share.
II	ENG	Ethical Standards and Financial Law	3	x	Aims, context and significance of ethical standards and legal regulations in financial market.
II	ENG	Ethical Standards and Financial Law	3	x	Nonpublic information and market manipulation.
II	ENG	Ethical Standards and Financial Law	3	x	Conflicts of interest.
II	ENG	Asset Allocation and Investment Strategies	3	x	Multifactor models and their practical applications
II	ENG	Asset Allocation and Investment Strategies	3	x	Active and passive asset management. Performance attribution and analysis.
II	ENG	Asset Allocation and Investment Strategies	3	x	Momentum and contrarian strategies and their implementation
II	ENG	Machine Learning in Finance I	4	x	Assessing model accuracy, machine learning diagnostics
II	ENG	Machine Learning in Finance I	4	x	Basic Supervised Learning models (KNN, SVM, Decision Trees)
II	ENG	Machine Learning in Finance I	4	x	Crucial machine learning techniques (feature engineering, regularization)
II	ENG	Machine Learning in Finance I	4	x	Methods of assessment of ML models for regression and classification problems
II	ENG	Machine Learning in Finance II	3	x	Boosting models (1. AdaBoost 2. Gradient Boosting 3. eXtreme Gradient Boosting)
II	ENG	Machine Learning in Finance II	3	x	Neural network models: Multilayer Perceptrons
II	ENG	Machine Learning in Finance II	3	x	Neural network models: Recurrent Neural Network

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II	ENG	Equity and Fixed Income	5	x	Sources of risk and return in the Capital Asset Pricing Model
II	ENG	Equity and Fixed Income	5	x	The concept of “alpha” and “beta” in analyzing fund returns
II	ENG	Equity and Fixed Income	5	x	Discounted cash flow approach to equity valuation
II	ENG	Equity and Fixed Income	5	x	Main factors determining the evolution of yield curves over time
II	ENG	Equity and Fixed Income	5	x	Yield to maturity vs. rate of return on a bond
II	ENG	Derivatives Market	4	x	Futures and forward contracts: concept, specifications, pricing
II	ENG	Derivatives Market	4	x	Swaps: types, mechanics
II	ENG	Derivatives Market	4	x	Option contracts: types, valuation, factors influencing option prices, positions and its implications
II	ENG	Derivatives Market	4	x	Greek letters in managing options portfolio
II	ENG	Corporate Finance	4	x	Corporate financing: equity, debt, and other methods of financing
II	ENG	Corporate Finance	4	x	Dividend policy: types of dividends, reasons to pay dividends, taxation and dividends, optimal dividend model
II	ENG	Corporate Finance	4	x	Optimal capital structure: theories and evidence
II	ENG	Corporate Finance	4	x	Mergers: types, reasons, costs and gains
II	ENG	Computational Finance	5	x	Portfolio optimization: risk-return representation of portfolios, generating the efficient frontier, combining risk-free and risky assets.
II	ENG	Computational Finance	5	x	Asset pricing: the single-index model, estimating beta coefficient, the CAPM model.
II	ENG	Computational Finance	5	x	Options on equities: hedge portfolios, risk-neutral valuation, simple one-step binomial tree
II	ENG	Computational Finance	5	x	Models for interest rates: Vasicek model vs other methods
II	ENG	Computational Finance	5	x	Value-at-Risk estimation
II	ENG	Reproducible Research	3	x	Publication bias - reasons and solutions
II	ENG	Reproducible Research	3	x	Common problems with reproducibility and replication
II	ENG	Reproducible Research	3	x	Version control systems and collaboration
II	ENG	Risk Analysis and Modelling I	5	x	Measures of risk and their properties
II	ENG	Risk Analysis and Modelling I	5	x	Liquidity risk analysis: aims, methods and implications
II	ENG	Risk Analysis and Modelling I	5	x	Interest rate risk analysis: aims, methods and implications
II	ENG	Risk Analysis and Modelling I	5	x	Duration method in asset liability management
II	ENG	Risk Analysis and Modelling I	5	x	Estimation of yield curve
II	ENG	Risk Analysis and Modelling II	4	x	Value at risk: aims, methods of estimating, implications x
II	ENG	Risk Analysis and Modelling II	4	x	Cholesky and eigendecomposition of a matrix: definition, properties, applications
II	ENG	Risk Analysis and Modelling II	4	x	Stress testing of the risk: methods and implications
II	ENG	Risk Analysis and Modelling II	4	x	Credit default models: types, assumptions and implications
II	ENG	C++ in Quantitative Finance I	4	x	Concept of Monte-Carlo simulations in the option pricing
II	ENG	C++ in Quantitative Finance I	4	x	Methods of variance reduction in Monte-Carlo option pricing
II	ENG	C++ in Quantitative Finance I	4	x	Pricing of Path-dependent vs non-path dependent options.
II	ENG	C++ in Quantitative Finance I	4	x	Barrier options: concept and pricing
II	ENG	C++ in Quantitative Finance II	4	x	Importance Sampling in Financial Simulations
II	ENG	C++ in Quantitative Finance II	4	x	Central Limit Theorem and applications in Monte-Carlo techniques
II	ENG	C++ in Quantitative Finance II	4	x	Measuring precision of option pricers.
II	ENG	C++ in Quantitative Finance II	4	x	Monte-Carlo techniques for Asian options.
II	ENG	Theory and practice of option pricing	6	x	Main types of options, parity relationship between them and static option strategies/positions
II	ENG	Theory and practice of option pricing	6	x	Key parameters in the Black-Scholes formula for the price of a call option
II	ENG	Theory and practice of option pricing	6	x	Option risk sensitivities (Greek letters)
II	ENG	Theory and practice of option pricing	6	x	The process of delta-hedging and its challenges
II	ENG	Theory and practice of option pricing	6	x	Implied vs. realized volatility and the choice of volatility parameter in delta hedging
II	ENG	Theory and practice of option pricing	6	x	Options and other derivatives: speculating vs. hegding

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II	ENG	Empirics of Financial Markets	4	x	Volatillity Models for Financial Time Series
II	ENG	Empirics of Financial Markets	4	x	Factor Models for Stock Prices
II	ENG	Empirics of Financial Markets	4	x	Exchange Rate Models
II	ENG	Empirics of Financial Markets	4	x	Modelling Yield Curve for Treasury Bonds
II	ENG	Automatic Transactional Systems	4	x	Trading systems based on Technical Analysis methods.
II	ENG	Automatic Transactional Systems	4	x	Trading systems based on Machine Learning methods.
II	ENG	Automatic Transactional Systems	4	x	Risk metrics and performance metrics used in algorithmic trading.
II	ENG	Automatic Transactional Systems	4	x	Empirical properties of asset returns.