Zagadnienia odpowiadają programom studiów I stopnia z r.ak. 2021/22 oraz programom studiów II stopnia z r.ak. 2022/23 bo te roczniki bronią się wg planu w r.ak. 2023/24 lub później.
Please note that the topics correspond to AY 2021/22 1st cycle study programmes and AY 2022/23 2nd cycle study programmes since according to the study plan these students will be defending their theses in AY 2023/24 or later.

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Stopień / Cycle	Jęz. / Lang.	Przedmiot / Course	Zagadnienia / Topics	QF
II	ENG	Reproducible Research	Differences between repetition, reproduction and replication	x
II	ENG	Reproducible Research	General rules of code documentation and clean coding	x
II	ENG	Reproducible Research	Version control systems and collaboration - why and how	x
II	ENG	Reproducible Research	Reproducible environments - problems and solutions	x
II	ENG	Reproducible Research	Common problems with reproducibility and replication	x
II	ENG	Reproducible Research	Metaanalysis - reasons and goals	x
II	ENG	Statistics&Econometrics	Types of descriptive statistics and their role in data analysis	x
II	ENG	Statistics&Econometrics	Central Limit Theorem and normality assumption in statistical testing	x
II	ENG	Statistics&Econometrics	Diagnostics in the simple linear regression model	x
II	ENG	Introduction to Quantitative Finance	Efficiency of financial markets: the concept and its empirical testing	x
II	ENG	Introduction to Quantitative Finance	Risk and return principles: the Markowitz framework	x
II	ENG	Introduction to Quantitative Finance	Capital Asset Pricing Model: theory and applications	x
II	ENG	Introduction to Quantitative Finance	Arbitrage Pricing Theory: theory and applications	x
II	ENG	Introduction to Quantitative Finance	Idiosyncratic vs. systematic risk factors	x
II	ENG	Introduction to Quantitative Finance	Options and other derivatives: speculating vs. hegding	x
II	ENG	Macroeconomics for Finance	Monetary policy: goals, tools, instruments and strategies	x
II	ENG	Macroeconomics for Finance	Determinants of sovereign bonds yields and their implications for fiscal policy	x
II	ENG	Macroeconomics for Finance	Determinants of exchange rates	x
II	ENG	Macroeconomics for Finance	Financial cycles and business cycles	x
II	ENG	Time Series Analysis	Smoothing methods for time series	x
II	ENG	Time Series Analysis	Ex-post forecasting measures	x
II	ENG	Time Series Analysis	Stationarity and integrations of time series: concept and testing	x
II	ENG	Time Series Analysis	ARMA models: concepts, assumtions, estimation	x
II	ENG	Time Series Analysis	Stochastic and deterministic trends: implications for the ADF test	x
II	ENG	Time Series Analysis	Concept of cointegration and its testing	x
II	ENG	Time Series Analysis	Causality in time series	x
II	ENG	Time Series Analysis	VAR & VECM models and long-run relationship among time series	x
II	ENG	Time Series Analysis	Seasonality in time series models	x
II	ENG	Time Series Analysis	Modeling volatility and GARCH models	x
II	ENG	Time Series Analysis	Estimating Value-at-Risk with GARCH models	x
II	ENG	Time Series Analysis	Switching models: types and estimation	x
II	ENG	Quantitative Strategies	High-frequency data definition and characteristics	x
II	ENG	Quantitative Strategies	Statistical and econometric foundations of the common types of trading strategies	x
II	ENG	Quantitative Strategies	Mean-reverting, momentum strategies and pair trading	x
II	ENG	Quantitative Strategies	Building an automated strategy – study of entries and exits	x
II	ENG	Quantitative Strategies	Backtesting of the trading strategy and related biases	x
II	ENG	Quantitative Strategies	Evaluating performance of trading strategies	x
II	ENG	Quantitative Strategies	Statistical arbitrage strategies	x
II	ENG	Quantitative Strategies	Event arbitrage strategies	x
II	ENG	Financial Statement Analysis	Financial reporting standards	x
II	ENG	Financial Statement Analysis	Structure and components of the balance sheet, measurement bases for assets and liabilities, components of equity	x
II	ENG	Financial Statement Analysis	Cash flow statement: components, classification of cash flows, methods of cash flow statement preparation	x

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II	ENG	Financial Statement Analysis	Financial analysis techinques: objectives, tools and techniques	x
II	ENG	Ethical Standards and Financial Law	Aims, context and significance of ethical standards and legal regulations in financial market.	x
II	ENG	Ethical Standards and Financial Law	Nonpublic information and market manipulation.	x
II	ENG	Ethical Standards and Financial Law	Conflicts of interest.	x
II	ENG	Ethical Standards and Financial Law	Ethical and professional standards, laws and regulations in the financial market - trends and perspectives.	x
II	ENG	Asset Allocation and Investment Strategies I & II	Multifactor models and their practical applications	x
II	ENG	Asset Allocation and Investment Strategies I & II	Microstructure of financial markets and its role in strategy execution	x
II	ENG	Asset Allocation and Investment Strategies I & II	Active and passive asset management. Performance attribution and analysis.	x
II	ENG	Asset Allocation and Investment Strategies I & II	Momentum strategies and their implementation	x
II	ENG	Asset Allocation and Investment Strategies I & II	Analysis of option investments	x
II	ENG	Asset Allocation and Investment Strategies I & II	Volatility trading strategies	x
II	ENG	Asset Allocation and Investment Strategies I & II	Tactical asset allocation	x
II	ENG	Equity and Fixed Income	Sources of risk and return in the Capital Asset Pricing Model	x
II	ENG	Equity and Fixed Income	The concept of “alpha” and “beta” in analyzing fund returns	x
II	ENG	Equity and Fixed Income	Discounted cash flow approach to equity valuation	x
II	ENG	Equity and Fixed Income	Types of equity investment strategies	x
II	ENG	Equity and Fixed Income	Main components of equity returns and their predictability	x
II	ENG	Equity and Fixed Income	Yield to maturity vs. rate of return on a bond	x
II	ENG	Equity and Fixed Income	Use of interpolation in yield curve construction	x
II	ENG	Equity and Fixed Income	Main factors determining the evolution of yield curves over time	x
II	ENG	Equity and Fixed Income	List and explain three main factors driving a bond’s return over a given time period	x
II	ENG	Equity and Fixed Income	Main risk factors in a fixed income portfolio	x
II	ENG	Derivatives Market	Mechanics of options markets	x
II	ENG	Derivatives Market	Type of derivatives contracts and markets	x
II	ENG	Derivatives Market	Type of traders in financial markets	x
II	ENG	Derivatives Market	Forwards contracts: concept, specifications, pricing	x
II	ENG	Derivatives Market	Futures contracts: concept, specifications, pricing	x
II	ENG	Derivatives Market	Swaps: types, mechanics	x
II	ENG	Derivatives Market	Option contracts: types, valuation, factors influencing option prices	x
II	ENG	Derivatives Market	Options positions and its implications	x
II	ENG	Derivatives Market	Trading strategies with options	x
II	ENG	Derivatives Market	Greek letters versus option portfolio	x
II	ENG	Corporate Finance	Governance of the firm: goals, basic principles, conflicts of interest	x
II	ENG	Corporate Finance	Investment decisions: review of investment criteria	x
II	ENG	Corporate Finance	Risk and cost of equity capital: models, types of risk premia, beta and lambda coefficients	x
II	ENG	Corporate Finance	Corporate financing: equity, debt, and other methods of financing	x
II	ENG	Corporate Finance	Efficient market hypothesis and empirical evidence: implications for financial managers	x
II	ENG	Corporate Finance	Dividend policy: types of dividends, reasons to pay dividends, taxation and dividends, optimal dividend model	x
II	ENG	Corporate Finance	Optimal capital structure: theories and evidence	x
II	ENG	Corporate Finance	Measures of calculating cost of capital of the firm	x
II	ENG	Corporate Finance	Mergers: types, reasons, costs and gains	x
II	ENG	Corporate Finance	Working capital management: cash and inventory management, managing liquidity of assets and liabilities, trade credit and discounts	x
II	ENG	Computational Finance	Portfolio optimization: risk-return representation of portfolios, generating the efficient frontier, combining risk-free and risky assets.	x
II	ENG	Computational Finance	Asset pricing: the single-index model, estimating beta coefficient, the CAPM model.	x
II	ENG	Computational Finance	Options on equities: hedge portfolios, risk-neutral valuation, simple one-step binomial tree	x

Stopień / Cycle	Jęz. / Lang.	Przedmiot / Course	Zagadnienia / Topics	QF
II	ENG	Computational Finance	Models for interest rates: Vasicek model vs other methods	x
II	ENG	Computational Finance	Value-at-Risk estimation	x
II	ENG	Risk Analysis and Modelling I	Measures of risk and their properties	x
II	ENG	Risk Analysis and Modelling I	Liquidity risk analysis: aims, methods and implications	x
II	ENG	Risk Analysis and Modelling I	Modeling liquidity in a bank: gap method, core deposit and indicators	x
II	ENG	Risk Analysis and Modelling I	Interest rate risk analysis: aims, methods and implications	x
II	ENG	Risk Analysis and Modelling I	Duration method in asset liability management	x
II	ENG	Risk Analysis and Modelling I	Modeling short interest rate evolution: models and their properties	x
II	ENG	Risk Analysis and Modelling I	Estimation of yield curve	x
II	ENG	Risk Analysis and Modelling II	Methods of the reduction of positions in the portfolio.	x
II	ENG	Risk Analysis and Modelling II	Value at risk: aims, methods of estimating, implications	x
II	ENG	Risk Analysis and Modelling II	Cholesky and eigendecomposition of a matrix: definition, properties, applications	x
II	ENG	Risk Analysis and Modelling II	Copulas in risk management: definition, properties, applications	x
II	ENG	Risk Analysis and Modelling II	Stress testing of the risk: methods and implications	x
II	ENG	Risk Analysis and Modelling II	Credit scoring: methods, models, implications	x
II	ENG	Risk Analysis and Modelling II	Credit default models: types, assumptions and implications	x
II	ENG	C++ in Quantitative Finance I & II	Concept of Monte-Carlo simulations in the option pricing	x
II	ENG	C++ in Quantitative Finance I & II	Methods of variance reduction in Monte-Carlo option pricing	x
II	ENG	C++ in Quantitative Finance I & II	Pricing of Path-dependent vs non-path dependent options.	x
II	ENG	C++ in Quantitative Finance I & II	Barrier options: concept and pricing	x
II	ENG	Theory and practice of option pricing	Main types of options, parity relationship between them and static option strategies/positions	x
II	ENG	Theory and practice of option pricing	Key parameters in the Black-Scholes formula for the price of a call option	x
II	ENG	Theory and practice of option pricing	Option risk sensitivities (Greek letters)	x
II	ENG	Theory and practice of option pricing	The process of delta-hedging and its challenges	x
II	ENG	Theory and practice of option pricing	Implied vs. realized volatility and the choice of volatility parameter in delta hedging	x
II	ENG	Empirics of Financial Markets	Efficient Market Hypothesis and Its Empirical Tests	x
II	ENG	Empirics of Financial Markets	Volatillity Models for Financial Time Series	x
II	ENG	Empirics of Financial Markets	Factor Models for Stock Prices	x
II	ENG	Empirics of Financial Markets	Exchange Rate Models	x
II	ENG	Empirics of Financial Markets	Modelling Yield Curve for Treasury Bonds	x
II	ENG	Automatic Transactional Systems	Trading systems based on Technical Analysis methods.	x
II	ENG	Automatic Transactional Systems	Trading systems based on Machine Learning methods.	x
II	ENG	Automatic Transactional Systems	Risk metrics and performance metrics used in algorithmic trading.	x
II	ENG	Automatic Transactional Systems	Empirical properties of asset returns.	x
II	ENG	Machine Learning in Finance	Assessing model accuracy, machine learning diagnostics	x
II	ENG	Machine Learning in Finance	Basic Supervised Learning models (KNN, SVM, Decision Trees)	x
II	ENG	Machine Learning in Finance	Crucial machine learning techniques (feature engineering, regularization)	x
II	ENG	Machine Learning in Finance	Boosting models (1. AdaBoost 2. Gradient Boosting 3. eXtreme Gradient Boosting)	x
II	ENG	Machine Learning in Finance	Neural network models (1. Multilayer Perceptrons 2. Recurrent Neural Network)	x