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	DSBA	Zagadnienia / Topics
II	ENG	Applied Microeconomics	5	x	Experimental methods in economics
II	ENG	Applied Microeconomics	5	x	Risk and uncertainty
II	ENG	Applied Microeconomics	5	x	Time in economics (time value of money and ergodicity of economic processes)
II	ENG	Applied Microeconomics	5	x	Market mechanism and its testing methods
II	ENG	Applied Microeconomics	5	x	Economic rationality and consumer choice in experimental research
II	ENG	Applied Macroeconomics	5	x	Structure of a simple computable general equilibrium model
II	ENG	Applied Macroeconomics	5	x	International trade in a computable general equilibrium model
II	ENG	Applied Macroeconomics	5	x	Dynamic general equilibrium: Solow Model
II	ENG	Applied Macroeconomics	5	x	Dynamic stochastic general equilibrium: Real Business Cycles (RBC) model x
II	ENG	Applied Macroeconomics	5	x	Dynamic stochastic general equilibrium: New Keynesian model
II	ENG	Advanced Econometrics	6	x	Binary dependent variable models.
II	ENG	Advanced Econometrics	6	x	Panel data modelling
II	ENG	Advanced Econometrics	6	x	Methods of count data modelling
II	ENG	Advanced Econometrics	6	x	Stationarity and non-stationarity in Time Series Modelling.
II	ENG	Advanced Econometrics	6	x	Methods and criteria of econometric models selection
II	ENG	Advanced Econometrics	6	x	Time series modelling (ARIMA, (AR)DL and extentions)
II	ENG	Applied Finance	5	x	Value-at-Risk: definition, models, testing
II	ENG	Applied Finance	5	x	Path dependent option pricing
II	ENG	Applied Finance	5	x	Statistical tools in algorithmic trading
II	ENG	Applied Finance	5	x	Credit risk modelling - scoring cards and expected loss
II	ENG	Applied Finance	5	x	Capital structure – meaning, practices and formal definitions. Impact on firm’s valuation.
II	ENG	R intro	3	x	Typical issues with raw data preprocessing and how to overcome them
II	ENG	R intro	3	x	Types of objects in R - how more complex data structures extend from vectors
II	ENG	R intro	3	x	R as an example of an open source software - advantages and disadvantages of the open source software for data science
II	ENG	Python and SQL	4	x	Basic data structures in Python.
II	ENG	Python and SQL	4	x	Relational database management systems
II	ENG	Python and SQL	4	x	Functions and Objects in Python programming
II	ENG	Python and SQL	4	x	Data science libraries in Python
II	ENG	Algorithms for Data Science	6	x	Asympotitc notation: simplification and comparison of given running time functions
II	ENG	Algorithms for Data Science	6	x	Running time analysis and application of the Master Theorem
II	ENG	Algorithms for Data Science	6	x	Recursion with memoization and comparison to dynamic programming
II	ENG	Algorithms for Data Science	6	x	Properties and use cases of classic search and sorting algorithms (binary search, linear search, insertion sort, merge sort, heap sort, counting sort)
II	ENG	Algorithms for Data Science	6	x	Properties and use cases of important data structures (array indexed by keys implementing a dictionary, AVL tree, hash table, heap, stack, queue)
II	ENG	Algorithms for Data Science	6	x	Graph algorithms (Breadth-First Search, Dijkstra’s algorithm, Kruskal’s algorithm)
II	ENG	Statistics and Exploratory Data Analysis	5	x	The Role of Exploratory Data Analysis in the Modeling Process
II	ENG	Statistics and Exploratory Data Analysis	5	x	Data Visualization Techniques Based on Variable Type and Purpose
II	ENG	Statistics and Exploratory Data Analysis	5	x	Measures of Central Tendency and Their Role in Statistical Inference
II	ENG	Statistics and Exploratory Data Analysis	5	x	Statistical Association Measures for Different Types of Data
II	ENG	Statistics and Exploratory Data Analysis	5	x	Fundamentals and Applications of Statistical Hypothesis Testing
II	ENG	Introduction to Data Science	3	x	Importance of soft skills in data science.
II	ENG	Introduction to Data Science	3	x	Applications of datascience.
II	ENG	Introduction to Data Science	3	x	Different types of machine learning.

Stopień / Cycle	Jęz. / Lang.	Przedmiot / Course	Liczba zagadnień / Number of topics	DSBA	Zagadnienia / Topics
II	ENG	Unsupervised Learning	3	x	Clustering
II	ENG	Unsupervised Learning	3	x	Dimension reduction
II	ENG	Unsupervised Learning	3	x	Association rules
II	ENG	Webscraping and Social Media Scraping	3	x	Tools used for web scraping
II	ENG	Webscraping and Social Media Scraping	3	x	Efficiency of web scraping tools
II	ENG	Webscraping and Social Media Scraping	3	x	Responsible and polite web scraping
II	ENG	Advanced Programming in R	5	x	Advanced R programming functions
II	ENG	Advanced Programming in R	5	x	Object-oriented programming in R: S3, S4, R6
II	ENG	Advanced Programming in R	5	x	Vectorisation of the code
II	ENG	Advanced Programming in R	5	x	Use of C++ in R
II	ENG	Advanced Programming in R	5	x	Web applications and analytical dashboards in R
II	ENG	Advanced Visualisation in R	6	x	Visualistation techniques for categorical variables
II	ENG	Advanced Visualisation in R	6	x	Visualistation techniques for continuous variables
II	ENG	Advanced Visualisation in R	6	x	Visualistation techniques for 1D distribution
II	ENG	Advanced Visualisation in R	6	x	Visualistation techniques for 2D distribution
II	ENG	Advanced Visualisation in R	6	x	Visualisation techniques for Machine Learning Classification models
II	ENG	Advanced Visualisation in R	6	x	Role of ggplot2 package for data visualisation in R
II	ENG	Machine Learning I	4	x	Evaluating performance and validation of machine learning algorithms
II	ENG	Machine Learning I	4	x	Feature selection and feature engineering
II	ENG	Machine Learning I	4	x	Parametric vs non-parametric algorithms - pros and cons
II	ENG	Machine Learning I	4	x	Regularization - motivation and common approaches
II	ENG	Machine Learning II	4	x	Advantages and disadvantages of decision trees
II	ENG	Machine Learning II	4	x	Differences between bagging and boosting techniques
II	ENG	Machine Learning II	4	x	Types of ensemble learning
II	ENG	Machine Learning II	4	x	Neural networks: their mechanisms and applications
II	ENG	Text Mining and Social Media Mining	4	x	Text preprocessing
II	ENG	Text Mining and Social Media Mining	4	x	Text categorization
II	ENG	Text Mining and Social Media Mining	4	x	Topic modelling
II	ENG	Text Mining and Social Media Mining	4	x	Sentiment analysis
II	ENG	Big Data Analytics	2	x	Big Data Storage and Processing Techniques (including concept and advantages of columnar storage, MapReduce programming model)
II	ENG	Big Data Analytics	2	x	System Reliability in Big Data: Fault Tolerance and High Availability
II	ENG	Reproducible Research	4	x	Version control systems and collaboration
II	ENG	Reproducible Research	4	x	Reproducible environments - problems and solutions
II	ENG	Reproducible Research	4	x	Publication bias - reasons and solutions
II	ENG	Reproducible Research	4	x	Common problems with reproducibility and replication
II	ENG	Communication and autopresentation	2	x	Principles and structure of a good presentation and self-presentation
II	ENG	Communication and autopresentation	2	x	Active listening, giving and taking feedback on presentations
II	ENG	Negotiations	3	x	Characteristics, advantages and disadvantages of principled vs distributive negotiations
II	ENG	Negotiations	3	x	Principles of effective argumentation, dealing with objections, and conceding in negotiations
II	ENG	Negotiations	3	x	Thomas-Kilmann's theory of conflict resolution