



Subject card

Subject name and code	Business Data Analytics, PG_00053096						
Field of study	Data Engineering						
Date of commencement of studies	October 2025	Academic year of realisation of subject			2027/2028		
Education level	first-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			English		
Semester of study	5	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Informatics In Management -> Faculty of Management and Economics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Nina Rizun				
	Teachers		dr Nina Rizun mgr Jaromir Durkiewicz				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	45		5.0		50.0	100
Subject objectives	The aim of the course is to familiarize students with basic data analytics algorithms in the context of discovering knowledge from unstructured data of business organizations.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_K03] demonstrates the ability to think critically and analytically and integrates knowledge from many disciplines in order to make effective decisions		The student demonstrates the ability to critically interpret data analysis results, integrates knowledge from data analytics, economics, and management, and applies it to formulate conclusions and support business decision-making.		[SK2] Assessment of progress of work [SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work		
	[K6_W03] identifies veracious sources of information relevant to the analyzed issues		The student identifies, acquires, and critically evaluates data from various sources (e.g., databases, business reports, open datasets) and applies them to analyze and interpret business problems using basic data analytics tools.		[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation		
	[K6_U06] acquires new knowledge, planning its own development in aiming at achieving defined goals		The student independently expands their knowledge and competencies in data analytics by searching for specialized materials, analytical tool documentation, and business application examples, and uses them to plan their professional development in data analysis and data-driven decision-making.		[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task		

Subject contents	<p>Course content – lecture</p> <ol style="list-style-type: none"> 1. What is Business Data Analytics? CRISP-DM. Data preparation. Data mining methods 2. What is Text Analytics (BTA)? Text Analytics & NLP. Text Analytics tasks. Search evaluation metrics. Keyword based search. Search based on vector representation. Techniques for pre-processing text documents. Zipf's law 3. Corpus. Properties of vector representation. Determining the frequency matrix (Calculating weights). Binary representation. Inverse-document frequency (IDF). TFIDF weighting scheme. Vector representation of a document. Distance/similarity measurement. Distance calculation methods. Similarity calculation methods. Cluster analysis grouping. Hierarchical agglomerative methods. Example of the Hierarchical Method. K-optimization methods. 4. Cosine similarity. Euclidean distance vs. Cosine similarity. Adjacency matrix and visualization. Similarities using graphs. Adjacency matrix. The degree of a graph node. Network community structure. 5. Multidimensional Scaling (MDS): Motivation. Goals. Formal model. Stress (Goodness-of-fit). Latent Semantic Group Analysis (LSA): Motivation. Vector model: Limitations. Singular Value Decomposition. LSA dimension reduction. Similarity of documents. Similarity of words. Automatic topic modeling of text data. Latent Dirichlet Allocation (LDA). 6. Introduction to Sentiment Analysis 7. Structural Topic Modeling 8. SNA - introduction. History of social network analysis theory. Small world theory. Milgram experiment. Relationships as a network. Directed graph. Undirected graph. Edge attributes. Graph density. Reachability and distance. Centrality measures <hr/> <p>Course content – laboratory</p> <ul style="list-style-type: none"> • Basic Text Analytics in RFile • TF-IDF transformation. Cluster analysis using RFile • Cosine similarity. Network graphs using R • Topic Modeling. Multidimensional Scaling and Latent Semantic Analysis • Opinion Mining and Sentiment Analysis • Structural Topic Modelling • Social Network Analysis. Basic Network Measures 														
Prerequisites and co-requisites															
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 920 794 954">Subject passing criteria</th> <th data-bbox="794 920 1139 954">Passing threshold</th> <th data-bbox="1139 920 1487 954">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 954 794 987">Project</td> <td data-bbox="794 954 1139 987">60.0%</td> <td data-bbox="1139 954 1487 987">40.0%</td> </tr> <tr> <td data-bbox="453 987 794 1021">Exercises classes</td> <td data-bbox="794 987 1139 1021">60.0%</td> <td data-bbox="1139 987 1487 1021">20.0%</td> </tr> <tr> <td data-bbox="453 1021 794 1055">Final test</td> <td data-bbox="794 1021 1139 1055">60.0%</td> <td data-bbox="1139 1021 1487 1055">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Project	60.0%	40.0%	Exercises classes	60.0%	20.0%	Final test	60.0%	40.0%
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Provost, Foster, Fawcett, Tom. Data Science for Business: What you need to know about data mining and data-analytic thinking. " O'Reilly Media, Inc.", 2019 2. Sharda, R., Delen, D., & Turban, E. Business intelligence: a managerial perspective on analytics. Pearson. 2018 3. Siegel, E. Predictive analytics: The power to predict who will click, buy, lie, or die. John Wiley & Sons, 2016. 338 pp. 4. James, G., Witten, D., Hastie, T., Tibshirani, R. An introduction to statistical learning with applications in R. Springer, 2018. 													
	Supplementary literature	<ol style="list-style-type: none"> 1. Han, J., Kamber, M., Pei, J. Data mining concepts and techniques. Morgan Kaufmann, 2021. 2. Hastie, T., Tibshirani, R., Friedman, J. The Elements of Statistical Learning, 2nd edition. Springer, 2022. 3. James, G. et al. An introduction to statistical learning. Springer, 2013. 426 pp. 4. Murphy, K. Machine Learning: A Probabilistic Perspective. MIT Press, 2019 													
	eResources addresses														
Example issues/ example questions/ tasks being completed	<p>Select the main properties of Euclidean distance</p> <p>Select the appropriate cosine similarity measure value between document 1 and document 2</p> <p>K-means algorithm allows...- What is the difference between Euclidean distance and cosine similarity measure?</p> <p>A person with high eigenvector centrality is..</p> <p>Please calculate the IDF for terms from the following Corpus</p> <p>Construct a Zipf's law graph for the following Corpus</p> <p>Give a general description of the actors of the following social network</p>														

Practical activities within the subject	Not applicable
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