



Subject card

Subject name and code	PropTech and Digital Transformation of the Real Estate Market, PG_00069949						
Field of study	Real Estate 5.0						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group		Obligatory subject group in the field of study 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	1		Language of instruction		Polish polish		
Semester of study	2		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Geodesy -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Małgorzata Renigier-Biłozor				
	Teachers		mgr inż. Kornelia Grzelka				
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						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/user/index.php?id=7364 Moodle ID: 7364 PropTech i transformacja cyfrowa rynku nieruchomości https://enauczanie.pg.edu.pl/2025/course/view.php?id=7364						
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		3.0		27.0	75
Subject objectives	The course aims to familiarize students with the concept of PropTech and key trends in the digital transformation of the real estate sector, as well as to develop skills in the informed use of digital technologies and data analytics in processes related to the market, valuation, management, and decision-making. The course scope covers solutions supporting the digitalization of real estate and buildings, data integration and analysis, process automation, artificial intelligence and machine learning, semantic technologies and large language models (LLMs), as well as selected systems and tools currently used in the real estate sector. In the practical component, students work on specific analytical problems and real estate data, learning to evaluate the utility, quality, and limitations of the methods employed. A key element of the course is the critical assessment of the outcomes of digital technologies and the role of the expert in decision-making processes.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U05] is able to manage real estate assets throughout their entire life cycle, applying knowledge in the areas of brokerage, investment, and asset management. The student can utilize modern tools and technologies (including digital solutions, PropTech, and BIM), incorporate the principles of sustainable development, ESG, wellbeing, and green certifications, as well as conduct due diligence analyses and effectively implement investment projects.	knows how to use modern tools and technologies (including digital solutions and PropTech)	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
	[K7_W05] possesses advanced interdisciplinary knowledge of procedures, methods, and theories related to real estate trading, property management, and operation, as well as other processes characteristic of the functioning of the real estate market. The student understands the organizational and legal conditions governing the professional practice of real estate agents, property managers, and other specialists operating within the real estate sector.	possesses advanced, interdisciplinary knowledge of the procedures, methods, and theories related to real estate trading, management, and operation, as well as other processes characteristic of the functioning of the real estate market.	[SW3] Assessment of knowledge contained in written work and projects

Subject contents	Course content – lecture		
	1. PropTech, Data and AI in the Real Estate Market (3 h) The concept and evolution of PropTech; digital transformation of the real estate sector; data sources and types; data quality, completeness and representativeness; Machine Learning, AVMs and decision-support systems; the role of the expert in an AI-driven environment. 2. Intelligent Feature Selection and Information Relevance in Real Estate Analysis (2 h) Property attributes and market factors; dependent and explanatory variables; correlation analysis; multicollinearity and information redundancy; Hellwig's method and information capacity; feature reduction; the role of feature selection in modelling and real estate market analysis. 3. AI and Predictive Modelling in Real Estate Valuation (2 h) Supervised learning and regression; MLP neural networks; layers, neurons and activation functions; the learning process; regularisation; overfitting and generalisation; data splitting; cross-validation; RMSE, MAE, MAPE and R²; comparison of simple and complex models; interpretation of results. 4. Intelligent Similarity Analysis and Selection of Comparable Properties (2 h) Representation of properties in feature space; distance and similarity measures; nearest-neighbour methods; cosine similarity; selection of the number of similar properties; group homogeneity; the difference between mathematical similarity and expert market assessment. 5. LLMs, Embeddings and Generative AI in the Real Estate Sector (4 h) Textual data and semantic representation of information; embeddings; Sentence Transformers/SBERT; semantic similarity; information extraction and structuring; the use of LLMs in real estate information systems and other PropTech applications; opportunities, limitations and the human-in-the-loop approach. 6. Final Assessment (2 h)		
	Course content – laboratory		
	L1. Intelligent Feature Selection and Information Relevance in Real Estate Data L2. AI in Real Estate Valuation – Predictive Modelling and Neural Networks L3. Intelligent Selection of Similar and Comparable Properties L4. Digital Environment and PropTech Tools L5. AI, Generative AI and LLMs in the Real Estate Sector L6. Integrated PropTech Application – Case Study		
Prerequisites and co-requisites	Basic knowledge of real estate, data analysis, and statistics. Programming skills are not required.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final assessment: topics from lectures + evaluation of PropTech applications	60.0%	30.0%
	Laboratory assignments / analysis and interpretation of results	60.0%	70.0%
Recommended reading	Basic literature	- Orange Data Mining, Documentation and Educational Materials, University of Ljubljana, aktualna wersja online. - Géron A., Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow, O'Reilly Media, aktualne wydanie. - Goodfellow I., Bengio Y., Courville A., Deep Learning, MIT Press, Cambridge, 2016.	
	Supplementary literature	Baum A., PropTech 3.0: The Future of Real Estate , Said Business School, University of Oxford, Oxford, 2017.	
	eResources addresses		

Example issues/ example questions/ tasks being completed	• What data and technologies form the basis of modern PropTech solutions? • How can information relevance be assessed and significant attributes selected for real estate market analysis? • How can artificial intelligence and neural networks be used for real estate value modelling and prediction? • How can the quality of a predictive model be assessed using selected performance measures and validation methods? • How can similar properties be identified and the selection of comparable properties supported by analytical methods? • How can embeddings and LLM-based language models be used to analyse and structure real estate information? • What is the role of the expert in assessing data quality, interpreting AI results and supporting decision-making in the real estate sector?
Practical activities within the subject	Not applicable

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