GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	SCORING MODELS, PG_00070288		
Field of study	MODELE SCORINGOWE		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional subject group Subject group related to scientific research in the field of study
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	Polish
Semester of study	4	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Statistics and Econometrics -> Faculty of Management and Economics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Błażej Kochański	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	8.0	16.0	0.0	0.0	0.0	24

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	24	4.0	47.0	75

Subject objectives

Applies scoring models in risk and profitability management of the bank and in other relevant contexts.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W05] Possesses in-depth knowledge of the principles of integrating economic, legal, and ethical contexts in analyses and applying them in entrepreneurial activities while respecting copyright protection rules	The student identifies variables that enable creditworthiness assessment, their sources, and their predictive power. The student is able to assess the quality of the constructed model.	[SW1] Ocena wiedzy faktograficznej
[K7_U04] Prepares and delivers convincing presentations of the results of specialized analyses, providing in-depth interpretations during debates and meetings with diverse audiences.	The student presents a professional presentation of the results of scoring analyses, providing an in-depth interpretation of the proposed assessments.	[SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania [SU1] Ocena realizacji zadania

Subject contents	Course content – lecture • Concepts: scoring model and scorecard. • Credit scoring, credit capacity, creditworthiness, risk assessment. • Typology of bank scoring models. • Data used in credit models; credit information bureaus. • Credit scoring: good/bad customer, default, delinquency measurement. • Building scoring models: statistical tools and machine learning methods. • Bayes theorem; naïve Bayes classifier. • Logistic regression; logistic regression based on Weight of Evidence (WoE). • Scoring models in bank management. • Reject inference methods. • Use of score-based assessment; risk-based pricing. • Process of building and implementing a scoring model; validation and monitoring. • Development of bank scoring models latest trends. Course content – exercises • Assessing the quality of scoring models: confusion matrix, ROC curve, Gini coefficient, KS, lift. • Transformations of the target variable: probability, frequency, odds, log-odds. • Explanatory variables in scoring models: discretization (bucketing, binning), missing data. • Variable selection for scoring models; measuring the predictive power of individual variables; Information Value, Weight of Evidence. • Building models based on the naïve Bayes classifier. • Building models based on logistic regression and WoE-based logistic regression. • Scaling and calibration of scoring models. • Setting cut-off points. • Delinquency measurement using the vintage method. • Machine learning tools in scoring models; explainable AI methods. • Practical aspects of reject inference.

<table>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Calculation tasks and test questions</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Project</td><td>60.0%</td><td>60.0%</td></tr>
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</td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>• Naeem Siddiqi Intelligent credit scoring: building and implementing better credit risk scorecards John Wiley & Sons, 2017.
• Raymond A. Anderson Credit intelligence & modelling: many paths through the forest Rayan Risk Analytics, Inc., 2019</td></tr>
<tr><td>Supplementary literature</td><td>• Lyn Thomas, Jonathan Crook, David Edelman Credit scoring and its applications Society for Industrial and Applied Mathematics, 2017
• Mariola Kapla: O historii kredytowej i scoringu BIK ScoringExpert, 2019</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">• Evaluate the discriminatory power of the model based on the data presented.
• Build a logistic regression model using the indicated variables.
• Determine the cut-off point for a scoring card with the given properties.
• Assess the predictive power of individual features and their importance in the model.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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