GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Scoring Models, PG_00073975		
Field of study	Economic Analytics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
Education level	second-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	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	15.0	30.0	0.0	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	25.0	75

Subject objectives

Preparing students for the practical application of methods for building and evaluating scoring models in credit risk assessment processes in banks and other business applications, based on knowledge of data analysis, statistical methods, and principles of machine learning model construction. The aim is also to shape attitudes related to reliable, clear, and responsible communication of scoring analysis results, as well as collaboration during project tasks in the context of business decision-making.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_W05] has in-depth knowledge of integrating economic, legal, and ethical aspects in analyses and their application in entrepreneurial activities.	Knows and understands the types and sources of data used in scoring models, the principles of data preparation, selection, and measurement of predictive power, as well as statistical tools and machine learning methods in the context of building, validating, and applying scoring models in banks and other businesses.	[SW1] Assessment of factual knowledge
[K7_U04] is able to prepare and convincingly present the results of specialized analyses, providing in-depth interpretation during debates and meetings with various audiences.	Is able to prepare and deliver a professional presentation of scoring analysis results, using appropriate methods of interpretation, visualization, and communication, in order to clearly explain the proposed solutions to the audience and discuss the key elements of the scoring model.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task

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

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Delinquency measurement using the vintage method
Machine learning tools in scoring models; explainable AI methods
Practical aspects of reject inference

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<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>Project (construction of a scoring model and a report presenting it).</td><td>60.0%</td><td>60.0%</td></tr>
<tr><td>Tests (computational tasks and multiple-choice questions).</td><td>60.0%</td><td>40.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><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

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<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

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<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>

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.

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<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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