University of Gdańsk

Subject card

Subject name and code	Latent Variable and Censored Data Models, PG_00178727		
Field of study	Informatics and Econometrics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2027/2028
Education level	Master's studies	Subject group	Obligatory subject group in the field of study 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	5.0
Learning profile	academic	Assessment form	credit
Conducting unit	Department of Statistics -> Faculty of Management -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. Ewa Wycinka	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	16.0	0.0	16.0	0.0	0.0	32

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	32	2.0	91.0	125

Subject objectives

The aim of the course is to familiarize students with advanced data analysis methods, particularly with hidden variable models and techniques for handling censored data.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[IiEMU2_W06] The student possesses a structured understanding of the processes, methods, and tools necessary for the design, creation, development, and provision of suitable conditions for informatics, econometrics or statistics tools.	The student knows the basic concepts and definitions related to hidden variable models and censored data. The student understands the theoretical foundations and assumptions of hidden variable models and methods for analyzing censored data.	[SW2] presentation/project/paper/ report
[IiEMU2_U01] The student can creatively and profoundly analyze complex social and economic processes using structured knowledge, econometrics, informatics, or statistics tools.	The student can interpret the results of analyses of hidden variables and censored data and draw conclusions from them.	[SU2] presentation/project/paper/ report
[IiEMU2_U03] The student is able to obtain and verify data from properly selected sources and to collect, process, and visualize it using modern econometrics, informatics or statistics tools.	The student knows the basic concepts and definitions related to hidden variable models and censored data. The student understands the theoretical foundations and assumptions of hidden variable models and methods for analyzing censored data.	[SU2] presentation/project/paper/ report

Subject contents	Introduction to Censored Data: Definition of censored data. The essence of survival analysis (event history analysis) and examples of applications in various fields (medicine, engineering, economics). Duration as a random variable. Estimators of the life duration model function for censored data (reduced sample estimator, actuarial estimator, Kaplan-Meier estimator, Aalen-Nelson estimator). Statistical tests in censored data analysis. Regression Models in Event History Analysis: Cox proportional hazards model. Explanatory variables in regression models (coding method, variable functions). Verification of Cox model assumptions (testing proportional hazards, residuals in the model). Model fit assessment. Time-dependent variables. Accelerated Failure Time (AFT) Models: Basic assumptions of AFT models. Comparison with proportional hazards models. Definition of the hazard function in the context of AFT models. Survival function and its estimation. Parameterization of AFT models. Parameterization of distributions (e.g., Weibull distribution, log-logistic distribution). Parameter estimation methods. Considering time-dependent variables in AFT models. Diagnostics of AFT models. Checking AFT model assumptions. Examples of AFT model applications in various fields (medicine, economics, engineering). Hidden Variable Models: Definition of hidden variables. Examples of applications in various fields (psychometrics, sociology, economics). Latent Class Analysis (LCA), Factor Analysis, Item Response Theory (IRT). Parameter Estimation: Methods for estimating parameters of hidden variable models. Criteria for model fit assessment. Model diagnostics. Checking assumptions of hidden variable models. Mixed IRT Models: Mixed factor analysis models. Structural Equation Models (SEM). Introduction to SEM. Path Analysis. Confirmatory Factor Analysis (CFA). Parameter estimation and diagnostics of SEM models. Practical applications of SEM.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
project 1	51.0%	50.0%
project 2	51.0%	50.0%

Recommended reading	Basic literature	Wycinka E., Modele zdarzeń konkurujących i ich zastosowania w ocenie ryzyka niewypłacalności pożyczkobiorcy, Wyd. UG 2019 (rozdziały 1.1-1.3; 2.1-2.3) Balicki A., Analiza przeżycia i tablice wymieralności, PWE, Warszawa 2006; Jackowska B., Modele dalszego trwania życia oraz ich zastosowania w przypadku osób starszych, Wyd. UG 2013 Stanisz A., Przystępny kurs statystyki z zastosowaniem STATISTICA PL na przykładach z medycyny. Tom 3. Analizy wielowymiarowe, Rozdział 8, Statsoft Polska, Kraków 2007 Collins, L. M., & Lanza, S. T. (2010). Latent Class and Latent Transition Analysis: With Applications in the Social, Behavioral, and Health Sciences. Wiley.

	Supplementary literature	Frątczak E.Gach-Ciepiela U., Babiker H., Analiza historii zdarzeń, SGH Warszawa 2005; Jurkiewicz T., Wycinka E., Significance tests of differences between two crossing curves for small samples, Acta Universitatis Lodziensis, Folia Oeconomica 255, 2011, s. 107-114 Klein J.P., Moeschberger M.L., Survival Analysis Techniques for Censored and Truncated Data, Springer-Verlag, 2003 Kleinbaum D., Klein M., Survival Analysis. A Self-Learning Text, Third Edition 2012 Lee, S. Y. (2007). Handbook of Latent Variable and Related Models. Elsevier.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.