GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	INCOME AND WELFARE DISTRIBUTION, PG_00069572		
Field of study	INCOME AND WELFARE DISTRIBUTION		
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	Full-time studies	Mode of delivery	at the university
Year of study	2	Language of instruction	English
Semester of study	3	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Statistics and Econometrics -> Faculty of Management and Economics -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Stanisław Kot	
	Teachers	prof. dr hab. Stanisław Kot	

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						
	eNauczanie source addresses: Moodle ID: 46954 Distribution of income and wealth 2025 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=46954						

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	4.0	26.0	75

Subject objectives	The course aims to acquaint students with the methods of analysing income distributions and their particular aspects, such as inequality, poverty and welfare. The most important theoretical forms of the distributions and the methods of estimating their parameters are presented. A project is the base of receiving a credit for the course. Minimum two-person and maximum four-person teams elaborate the project.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U03] Formulates research hypotheses and selects appropriate analytical methods for their verification, utilizing advanced IT tools, and critically evaluates the obtained results.	Students know the methods of analysing income distributions.	[SU1] Ocena realizacji zadania
	[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	Students can apply the statistical methods of analysing income distributions to assess income inequality, poverty and welfare.	[SW1] Ocena wiedzy faktograficznej

| Subject contents | • Income, wealth, welfare
• The classification of incomes
• The social welfare function
• The statistical description of income distribution
• Nonparametric (histogram, kernel)
• Parametric
• The descriptive measures of economic inequality
• The Lorenz function.
• Inequality measures (the Gini index, the Pietra index, the generalised entropy index, the generalised
• Gini index).
• The decomposition of inequality indices.
• Normative aspects of economic inequality
• The axioms of inequality measures
• The constant inequality aversion utility function
• The Atkinson inequality index
• The abbreviated functions of social welfare
• Inequality and welfare
• 1. The measurement of poverty
• The poverty line
• The FGT poverty indices
• The problem of decomposition of poverty measures
• The sources of statistical income data
• Household budget surveys
• Equivalence scales
• Theoretical income distributions
• The Pareto distribution
• The lognormal distribution
• The theories of income distributions genesis
• The generalised Beta distribution of the second kind
• The Dagum distribution
• The Singh-Maddala distribution
• The Fisk distribution
• 1. Estimating and testing theoretical income distributions
• The maximum likelihood method
• The goodness-of-fit tests
• The measurement of inequality aversion
• The dilemma: how much equality and how much effectiveness?
• The leaky bucket experiment
• Other methods of measuring inequality aversion
• International comparisons of income distributions
• The problem of statistical data comparability
• Databases
• The World income distribution
• Shorrocks-Wans method
• The clone method
• World economic inequality
• World economic poverty
• From income distributions to welfare distributions |
| | |

	• Other methods of measuring inequality aversion • International comparisons of income distributions • The problem of statistical data comparability • Databases • The World income distribution • Shorrocks-Wans method • The clone method • World economic inequality • World economic poverty • From income distributions to welfare distributions
Prerequisites and co-requisites	Descriptive and mathematical statistics

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final project	60.0%	100.0%

Recommended reading		
	Basic literature	• Kleiber, C., and S. Kotz. 2003. Statistical Size Distributions in Economics and Actuarial Sciences. New Jersey: John Wiley & Sons, Inc. • Kot, S.M., Ostasiewicz, K. (2019) Global and Regional Economic Inequality: Methods and evidence. Wroclaw, Publ. House of Wroclaw University of Economics. • Lambert, P.J. (2001). The distribution and redistribution of income: a mathematical analysis. Manchester: Manchester University Press. • Cowell, F. A., & Flachaire, E. (2015). Statistical methods for distributional analysis. In *Handbook of income distribution* (Vol. 2, pp. 359-465). Elsevier.
	Supplementary literature	• Jenkins, S.P. (2007). gb2fit: Stata module to fit Generalized Beta of the Second Kind distribution by maximum likelihood. Statistical Software Components Archive, S456823. • Kot S.M. (2023) Nonstandard Equivalence Scales and their Applications for European Union Countries. Gdansk, Gdańsk University of Technology Publishers.
	eResources addresses	Basic https://shs.hal.science/halshs-01115996/file/WP%202015%20-%20Nr%2007.pdf - Cowell, F. A., & Flachaire, E. (2015). Statistical methods for distributional analysis. In Handbook of income distribution (Vol. 2, pp. 359-465). Elsevier.

Example issues/ example questions/ tasks being completed	
Practical activites within the subject	Not applicable

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