University of Gdańsk

Subject card

Subject name and code	Statistics and Demographics, PG_00148185						
Field of study	Insurance - Interdisciplinary Studies						
Date of commencement of studies	October 2024		Academic year of realisation of subject	2024/2025			
Education level	Master's 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			
Semester of study	1		ECTS credits	4.0			
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	30.0	15.0	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		10.0	45.0	100	
Subject objectives	To acquire a basic knowledge of conducting statistical research and data analysis. To be introduced to the possible applications of statistical methods in insurance.To learn the basics of the theory of probability and the possibilities of applications of probability theory in insurance.To become familiar with basic concepts and methods of demography. To demonstrate the essence of demographic processes and their role and consequences for the functioning of social and economic insurance.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[UBEZMU2_U03] The student has developed skills to understand and analyze socio-economic phenomena, including by formulating and testing hypotheses related to insurance research problems.	The student correctly applies the concepts of statistics and demography and is able to carry out an analysis of the distribution of a variable. The student knows the basic applications of random variables in insurance.	[SU3] text preparation/written work [SU4] test/exam - oral or written
	[UBEZMU2_W08] The student knows the methods and tools, including data and information acquisition techniques, appropriate to the field of insurance and related disciplines.	The student has a basic knowledge of conducting statistical research and data analysis and knows the basics of the theory of probability. The student has a basic understanding of data sources and demographic processes.	[SW4] test/exam - oral or written [SW3] text preparation/written work
	[UBEZMU2_W01] The student has an expanded knowledge of insurance and its place in the system of sciences of economics and finance and legal sciences and its relationship to other sciences.	The student has knowledge of the importance of statistical methods and data analysis and probability theory in insurance. He/she understands the consequences of demographic processes for socio-economic life and insurance in particular.	[SW4] test/exam - oral or written [SW3] text preparation/written work
	[UBEZMU2_K03] The student thinks creatively, is able to go beyond the usual patterns, is able to think and act in an entrepreneurial manner, is able to adapt flexibly to the requirements of the environment.	The student understands the need to continuously complement and deepen the acquired knowledge; he/she is prepared to further expand his/her knowledge in the field of statistics and demography. He/she is able to communicate his/her knowledge and share his/her skills	[SK3] text preparation/written work [SK4] test/exam - oral or written
	[UBEZMU2_U01] The student has in-depth skills of observation and interpretation of phenomena related to economic and legal aspects of insurance, including the use of advanced information and communication techniques, and is able to integrate knowledge from various scientific disciplines.	The student is able to interpret information and statistical data. Student is able to access current information on demographic phenomena, they will be able to use demographic databases, he/she is able to present the causes and effects of demographic processes.	[SU3] text preparation/written work [SU4] test/exam - oral or written
	[UBEZMU2_U06] The student is able to independently plan and implement his own lifelong learning and lead others in doing so.	Students acquires basic skills in the application of concepts and methods from statistics, probability and demography to enable further exploration.	[SU3] text preparation/written work [SU4] test/exam - oral or written

Subject contents	**Statistics - introductory issues and structure analysis** 1. The concept and methods of statistics, the subject and scope of statistical research 2. Data presentation: series, tables, graphs 3. Analysis of distribution properties: central tendency, dispersion, asymmetry 4. Colloquium **Elements of probability** 1. The concept of probability 2. Discrete random variables and continuous random variables, measures describing the most important features of distributions; properties of selected discrete distributions (binomial, Bernouli, Poisson) and continuous distributions (uniform, exponential, normal); approximation of distributions 3. Truncated distributions 4. Applications of random variables in insurance: claim number distributions and claim value distributions 5. Colloquium **Demography** 1. Introductory terms: demography as a science of population processes, subject and scope of demographic research, sources of demographic data, basic demographic theories 2. Population size and structure by age and sex (population pyramid, biological and economic age groups, dynamics of changes in the size and structure and forecasts of further changes) 3. Demographic events: births, deaths, marriages, divorces and separations. Migration of the population: internal migrations, external migrations. Basic measures and tendencies fertility, mortality and migration 4. The process of ageing population and its implications for social security (changes in fertility and mortality patterns, the concept of population replacement, the increase in the proportion of older people, the increase in the aged dependency ratio) 5. Construction and interpretation of life tables. Analysis of death probabilities and life expectancy, tables constructed for pension purposes 6. Health status of the Polish population (selected results of a representative survey of the Central Statistical Office), main causes of death in Poland, healthy life expectancy 7. Households: formation, development and disintegration of households, changes in the number and structure of households and forecasts of further changes 8. Colloquium

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Knowledge of mathematics from the secondary school curriculum.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>colloquium 3</td><td>51.0%</td><td>33.0%</td></tr>
<tr><td>colloquium 2</td><td>51.0%</td><td>33.0%</td></tr>
<tr><td>colloquium 1</td><td>51.0%</td><td>34.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td>Basic literature</td><td>1) Statistics and probability calculus

Wycinka E., Szreder M. (red.), Zastosowania metod ilościowych w ubezpieczeniach, Wyd. UG, Gdańsk 2020 (rozdz. 1-7);

Makać W., Urbanek-Krzysztofiak D., Metody opisu statystycznego, Wyd. UG, Gdańsk 2004;

Balicki A, Makać W., Metody wnioskowania statystycznego, Wyd. UG, Gdańsk 2002;

2) Demography

Bednarczyk T. H., Bielawska K., Jackowska B., Wycinka E., Ekonomiczne i demograficzne uwarunkowania funkcjonowania i rozwoju ubezpieczeń, Wyd. UG, Gdańsk 2019 (rozdz. 5, 6, 7)

Holzer J.Z., Demografia, PWE, Warszawa 2006;

Okólski M., Fihel A., Demografia. Współczesne zjawiska i teorie, Wydawnictwo Naukowe Scholar, Warszawa 2012;</td></tr>
</table>

	Supplementary literature	1) Statistics and probability Aczel A. D., *Statystyka w zarządzaniu*, PWN, Warszawa 2000; Barańska Z., Jackowska B., Mondygrał-Piaszczyńska A., *Wzory i tablice statystyczne*, Wydawnictwo Wyższej Szkoły Bankowej w Poznaniu, Poznań 2006; Gronicki M., Szreder M., *Elementy rachunku prawdopodobieństwa i statystyki matematycznej*, Wyd. UG, Gdańsk 1992; Hellwig Z., *Elementy rachunku prawdopodobieństwa i statystyki matematycznej*, PWN, Warszawa 1993; Jóźwiak J., Podgórski J., *Statystyka od podstaw*, PWE, Warszawa 2000; Kassyk-Rokicka H., *Statystyka. Zbiór zadań*, PWE Warszawa 2001; Kot S. M., Jakubowski J., Sokołowski A., *Statystyka. Podręcznik dla studiów ekonomicznych*, Difin, Warszawa 2007; Sobczyk M., *Statystyka*, PWN, Warszawa 2000; 2) Demography Hrynkiewicz J., Potrykowska A. (red. nauk.), *Perspektywy demograficzne jako wyzwanie dla polityki ludnościowej Polski*, Rządowa Rada Ludnościowa, Warszawa 2016; Jackowska B., *Modele dalszego trwania życia oraz ich zastosowania w przypadku osób starszych*, Wydawnictwo Uniwersytetu Gdańskiego, Gdańsk 2013; Kędelski M., Paradysz J., *Demografia*, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań 2006; Kurkiewicz J. (red.), *Procesy demograficzne i metody ich analizy*, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie, Kraków 2010; *Prognoza gospodarstw domowych na lata 2016-2050*, GUS, Warszawa 2016; *Prognoza ludności na lata 2023-2060*, GUS, Warszawa 2023; *Stan zdrowia ludności Polski w 2019 r.*, GUS, Warszawa 2021; *Sytuacja demograficzna osób starszych i konsekwencje starzenia się ludności Polski w świetle prognozy na lata 2014-205*0, GUS, Warszawa 2014; *Sytuacja demograficzna Polski do 2022 r.*, GUS, Warszawa 2023; *Trwanie życia w 2023 r.*, GUS, Warszawa 2024
	eResources addresses	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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