GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Sociology of Quantification: Models at the Policy Interface , PG_00071045		
Field of study	Mathematics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	e-learning
Year of study	1	Language of instruction	English
Semester of study	2	ECTS credits	2.0
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 Samuele Lo Piano	
	Teachers	dr Samuele Lo Piano	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	0.0	30
	E-learning hours included: 30.0						

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	30	2.0	18.0	50

Subject objectives	The primary objective of this course is to equip master's students with a critical sociological understanding of **quantification** processes, particularly how **models** are constructed, deployed, and contested at the **policy interface**. Students will learn to analyze the social, political, and ethical implications of using quantitative models (e.g., in climate change, public health, or economic forecasting) to inform governance and decision-making, with a focus on issues of **uncertainty, ignorance,** and the **post-normal science** strategy.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U71] is able to apply knowledge from humanistic, social, economic or legal sciences in order to solve problems	K7_K71 (Knowledge): The student can articulate the core theoretical concepts of the sociology of quantification (e.g., 'performativity', 'data power') and the principles of post-normal science and its relevance to contemporary policy challenges.	[SU3] Assessment of ability to use knowledge gained from the subject
	[K7_K71] is able to explain the need to apply knowledge from humanistic, social, economic or legal sciences in order to function in a social environment	K7_W71 (Skills): The student is able to critically analyze a policy-relevant quantitative model, identifying its underlying assumptions, social biases, political effects, and performing a conceptual sensitivity auditing.	[SK5] Assessment of ability to solve problems that arise in practice
	[K7_W71] has general knowledge in humanistic, social, economic or legal sciences, including their fundamentals and applications	K7_U71 (Competence): The student can propose sociologically informed interventions or governance mechanisms to improve the transparency and accountability of models used in public policy, particularly in contexts of high stakes and high uncertainty.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation

Subject contents	Course content – lecture
	- **Introduction to the Sociology of Quantification (4 hrs):** *Defining quantification; historical and theoretical foundations (e.g., Foucault, Hacking, Porter). The shift from statistics to data and algorithms.*
	- **The Social Life of Models and Post-Normal Science (6 hrs)**: *The construction of models as social objects; boundary work between science and policy; model validation, calibration, and uncertainty. Introduction to post-normal science (Funtowicz & Ravetz) and the role of sensitivity auditing. Case studies: climate models, epidemiological models.*
	- **Quantification and Governance (6 hrs)**: *The role of metrics, indicators, and rankings in public administration. Governing by numbers; the politics of evidence-based policy. Focus on audit cultures and performance management.*
	- **Data Power and Algorithmic Governance (6 hrs):** *Critical perspectives on 'big data' and AI in policy. Bias, fairness, and discrimination in algorithmic decision-making systems (e.g., predictive policing, welfare allocation).*
	- **Contestation, Accountability, and the Honest Broker (6 hrs):** *Public resistance to quantification; data activism and counter-metrics. The role of the scientist in policy (Pielke's 'Honest Broker'). Mechanisms for model accountability, transparency, and ethical oversight (Saltelli, Sarewitz).*
	- **Conclusion and Future Directions (2 hrs)**: *Synthesis of key themes; emerging areas in the sociology of quantification (e.g., platform governance, digital sovereignty)*
Prerequisites and co-requisites	**Prerequisites:** *Basic knowledge of sociological theory and research methods. Familiarity with the policy-making process is beneficial.*
	Co-requisites: *None.*

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Essay	60.0%	75.0%
	Presentation	60.0%	25.0%

Recommended reading	Basic literature	1. Porter, Theodore M. (1995). *Trust in Numbers: The Pursuit of Objectivity in Science and Public Life. Princeton University Press.*
		2. O'Neil, Cathy (2016). *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown.*
		3. Funtowicz, Silvio O., and Jerome R. Ravetz (1993). "Science for the Post-Normal Age." *Futures 25(7): 739-755.*
		5. Pielke Jr., Roger A. (2007). *The Honest Broker: Making Sense of Science in Policy and Politics. Cambridge University Press.*
		6. Espeland, Wendy N., and Michael Sauder (2007). "Rankings and Reactivity: How Public Measures Reconfigure Social Worlds." *American Journal of Sociology 113(1): 1-40.*
		7. Zuboff, Shoshana (2019). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power. PublicAffairs.* (Selected chapters)
		8. Saltelli, Andrea, et al. (2020). "Five ways to ensure that models serve society: a manifesto." *Nature 582: 482-484.*
		9. Sarewitz, Daniel (2016). "The pressure to publish pushes down quality." *Nature 533: 147.*
		10. Jasanoff, Sheila (2004). *States of Knowledge: The Co-Production of Science and Social Order. Routledge.*
		11. Saltelli, Andrea, and Silvio Funtowicz (2014). "When all models are wrong." *Issues in Science and Technology 30(2).*
	Supplementary literature	*Relevant academic journals (e.g., Science, Technology, & Human Values, Social Studies of Science, Futures).*
		Policy reports from organizations like the OECD, UN, EU, or specific national bodies focusing on digital governance and AI ethics.
	eResources addresses	

Example issues/ example questions/ tasks being completed	*Example Issue:* Analyze the social and political consequences of using predictive risk models in the criminal justice system (e.g., COMPAS algorithm), considering the high stakes and high uncertainty of the policy context (Post-Normal Science). *Example Question:* How does the pursuit of objectivity through quantification paradoxically introduce new forms of subjectivity and political contestation into policy-making? Discuss this in light of Pielke's typology of science-policy roles. *Example Task:* Develop a short policy brief arguing for or against the use of a specific public health model (e.g., an infectious disease model) in setting lockdown measures, incorporating sociological critiques of its assumptions and performing a conceptual sensitivity auditing.
Practical activites within the subject	Not applicable