University of Gdańsk

Subject card

Subject name and code	Operational and work process analytics , PG_00199374						
Field of study	Economics						
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	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		4.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Economics and Management of Transportation Companies -> Faculty of Economics -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Michał Suchanek, prof. UG				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	30.0	0.0	30.0	0.0	60
	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	60		0.0		40.0	100
Subject objectives	The purpose of the course is to familiarize the student with the specifics of the operational sphere and work in the enterprise. After taking the course, the student should have the ability to apply analytical techniques based on qualitative and quantitative methods.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[EKONMU2_W06] has an in-depth understanding of statistical and econometric methods and tools for describing and modelling macro- and microeconomic economic structures and public institutions, as well as the processes taking place within them.	knows and uses methods of linear programming, dynamic programming, graph theory, network analysis, UMEWAP	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report [SW5] implementation of a problem task
[EKONMU2_U07] can independently propose solutions to complex economic or social problems, select methods of analysis and conduct conclusive procedures in this respect	is able to independently propose solutions to a complex operational or personnel problem in the enterprise using appropriate methods of analysis	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU5] implementation of a problem task
[EKONMU2_U04] can forecast and model complex economic and social processes using quantitative and qualitative methods and tools developed by economic sciences (including statistics and econometrics)	is able to build quantitative operational models using complex analytical techniques, with particular emphasis on quantitative forecasting	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU5] implementation of a problem task
[EKONMU2_U02] can use acquired knowledge to describe and analyse the causes and course of economic and social processes and phenomena, and can formulate his/her own opinions and critically select data and analysis methods based on the achievements of economic and social sciences	can describe the functioning of the operating system and analyze the effectiveness of the work system in the enterprise	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written [SU5] implementation of a problem task
[EKONMU2_W08] has an in-depth knowledge of processes occurring in enterprises and economic organisations and with related areas, as well as of processes of change in public institutions; knows methods of research on the regularities governing these changes, taking into account the influence of external stakeholders on them	Has an in-depth knowledge of the processes taking place in enterprises and economic organizations in the field of labor and production systems; understands the influence of the labor market and the market of production factors on these processes	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report [SW5] implementation of a problem task
[EKONMU2_W04] has an in-depth knowledge of different types of economic and social ties and regularities governing them; has an in-depth knowledge of economic and financial ties between enterprises	Understands the interrelationships between the subsystems of enterprise operations and also at the interface between the enterprise and markets	[SW4] test/exam - oral or written [SW2] presentation/project/paper/ report [SW5] implementation of a problem task
[EKONMU2_K01] recognises the importance of knowledge in the field of economics in the process of identifying and solving economic problems and of consulting experts when having difficulties in solving them independently	Identifies inefficiencies in the functioning of the operational and labor spheres of the enterprise and knows how to synthesize expert knowledge in this area	[SK2] presentation/project/paper/ report [SK4] test/exam - oral or written [SK5] implementation of a problem task

Subject contents	**1 Systematics of detailed issues of operational and labor analytics** **Educational content:** • Scope and role of operations analytics in production and resource management • Classification of areas of labor and operations analysis (materials, transportation, production, human resources) • Linking operational analytics with operational controlling, logistics and HR **Learning outcomes:** • The student understands the structure and objectives of operations analytics as a tool to improve the functioning of the organization • Can identify areas of application of analytics in operations management **2. quantitative and qualitative methods in operations research and work** **Educational Content:** • Statistical and simulation methods of operational analysis (e.g. regression, forecasting, analysis of variance) • Qualitative methods: interviews, observation, process mapping (e.g. VSM - Value Stream Mapping) • Integration of quantitative and qualitative data in the decision-making process **Learning outcomes:** • The student is able to select appropriate research methods to analyze operational phenomena and work • Interprets the results of analysis and presents conclusions for decision-making purposes **3 Material demand analytics** **Learning Content:** • Material demand forecasting (statistical and heuristic methods) • MRP I and MRP II planning systems - data structure, algorithms • Analysis of deviations in material consumption, evaluation of efficiency of material management **Learning outcomes:** • The student is able to apply analytical methods to forecast and control material demand • Analyzes the impact of operational variables on inventory and cost levels **4 Analytics of transportation issues** **Learning Content:** • Optimization of transportation routes (e.g., least cost method, northwest corner method). • Analysis of internal and external transportation costs • Performance indicators of transportation logistics **Learning outcomes:** • The student is able to design and optimize transportation processes using analytical tools • Interprets transportation data and formulates optimization recommendations **5 Analytics of the production flow** **Learning Content:** • Production flow analysis (cycle times, bottlenecks, line balancing) • Production efficiency indicators (OEE, resource utilization rate) • Analysis of sequences of operations - scheduling, Gantt diagrams **Learning outcomes:** • Student is able to analyze and improve the production flow • Applies methods to optimize the production flow and assesses the impact of technological changes **6 Analytics of production capacity utilization** **Learning Content:**

	• Measurement and planning of production capacity (CRP - Capacity Requirements Planning). • Analysis of capacity shortages and excesses • Simulation methods in the evaluation of production scenarios **Learning outcomes:** • The student analyzes the use of production capacities under different load variants • Can recommend changes in production schedules and resource allocation **7. labor resources analytics** **Learning Content:** • Measurement of working time and productivity (actual time, normative time, performance indicators) • Analysis of employee attendance, turnover and productivity • IT tools in HR analytics (e.g., HR dashboards) **Learning outcomes:** • The student is able to assess the efficiency of human resources use • Analyzes HR data and identifies areas for organizational improvement **8 Analyzes work organization issues** **Learning Content:** • Mapping of work processes (BPMN, VSM). • Analysis of workstation organization, ergonomics and information flow • Optimization of operational procedures **Learning outcomes:** • The student is able to identify and analyze imperfections in the organization of work • Proposes changes aimed at increasing operational efficiency **9 Analyzes the processes of valuing work** **Learning Content:** • Methods of valuing work: point, rank, comparative • Analysis of the links between the value of work and remuneration and competencies • Practical application of valuation in personnel policy **Learning outcomes:** • The student understands the methods of valuing work and is able to apply them in practice • Interprets the results of the analysis and supports their implementation in HR decisions
Prerequisites and co-requisites	The necessary scope of the student's knowledge is the identification of management functions and process approaches found in process approaches found in enterprises, so that knowledge of decision theory, including optimization theory, can be used in the education of this subject. A prerequisite is the ability to freely choose mathematical and statistical methods.
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Pass/fail assessment is based on attendance and participation in classes, the results of tests and assessments, and the completion of the project. Students prepare a project in teams of 3–4 people on the subject of operations research and work techniques; this is discussed and approved during consultations with the course tutor, and then presented in class. The grading scale is in accordance with the Study Regulations.	50.0%	20.0%
Analysis of practical problems	50.0%	20.0%
Final exam	50.0%	60.0%

Recommended reading	Basic literature	1.Ekonometria i badania operacyjne, pod red. M. Gruszczyńskiego, PWN. Warszawa 2022. 2.Metodologia wartościowania pracy pod red. Z. Martyniaka, PWN. Warszawa 2014. 3.Armstrong M.: Zarządzanie wynagrodzeniami, Oficyna a Walters Kluwer business. Kraków 2021.
	Supplementary literature	1.Wagner H.M.: Badania operacyjne, PWE. Warszawa 1980. 2. Suchanek, M. Badania operacyjne ograniczeń aktywności organizacji pozarządowych w kształtowaniu metropolitalnego rynku transportowego Trójmiasto. Studia Ekonomiczne 165, 2014. 3. Borkowska S.: Strategie wynagrodzeń, Oficyna ekonomiczna. Kraków, 2021.
	eResources addresses	
Example issues/ example questions/ tasks being completed	**What is the importance of capacity utilization analysis in making operational decisions?** **How can the efficiency of labor organization be evaluated at the workstation level?** **Explain how the scoring method differs from the rank method in the labor valuation process.** **Give an example of the application of material demand analysis in practice and discuss its impact on warehouse management.** **What are the main advantages and limitations of using qualitative methods in labor research?** **How can bottlenecks in the production flow be detected and how do they affect the entire production system?** **Outline how transportation data analysis can support logistics cost optimization.** **What data and indicators are worth considering when analyzing the efficiency of a production team?** **What is production scheduling and what are its key elements?** **What organizational benefits can be gained through the systematic application of operational analytics in the company?**	
Work placement	Not applicable	

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