GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Virtual Collaboration Teams, PG_00058933		
Field of study	Informatics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle 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	Part-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	Polish
Semester of study	5	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Intelligent Interactive Systems -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Bogdan Wiszniewski	
	Teachers	prof. dr hab. inż. Bogdan Wiszniewski dr inż. Jerzy Dembski	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30	4.0	66.0	100

Subject objectives	1. Introduce non-algorithmic computation models supporting collaborative work in a distributed environment. 2. Indicate new classes of applications supporting the growth of information society. 3. Demonstrate in practice basic classes of distributed interactive systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W41] Knows and understands, to an advanced extent, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining	Studenci potrafią optymalizować działania agentów ze względu na dynamicznie zmieniające się konteksty wykonania agentów (zasoby pamięciowe, właściwości łącza).	[SW1] Assessment of factual knowledge
[K6_U42] can apply tools and methods of designing, optimization, monitoring, management, increasing reliability and protection from safety hazards in local and distributed information systems and applications	Students can implement their own agent application using various programming platforms and protocols available on the Internet.	[SU1] Assessment of task fulfilment
[K6_U06] can analyse the operation of components, circuits and systems related to the field of study, measure their parameters and examine technical specifications	Students are able to optimize the activities of agents due to the dynamically changing contexts of agent performance (memory resources, network properties).	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
[K6_W04] knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	Students know non-algorithmic computation models for group work in a distributed environment, in particular open agent systems	[SW1] Assessment of factual knowledge
[K6_U43] can analyse date and formulate, apply and assess appropriate formal models and algorithms for solving problems in the field of information systems and applications	They have practical experience in developing collabirative applications by implementing various components of an interactive distributed system.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools

Subject contents

1. Space sharing techniques
2. Distributed interactive simulation
3. Algorithmic vs. interactive model of computations
4. Closed and open agent systems.
5. Implementability of negotiations, agent rationality.
6. Distributive and integrative bargaining
7. Classes of coordination tasks.
8. Classes of negotiation strategies.
9. Regressive out-guessing problem.
10. Socially inspired solution patterns.
11. Game state space.
12. Bounded rationality of agents
13. Coordination problems in game theory
14. Pareto optimality and Nash equilibrium
15. Prospect theory vs. utility theory
16. Networked virtual environments
17. Object-event architectures (SIMNET, DIS)
18. State prediction: dead-reckoning, ghost-objects
19. High Level Architecture standard: federation, federates, RTI
20. Generations of network games.
21. State sharing techniques
22. Dead reckoning protocols
23. State convergence techniques

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Final test	50.0%	40.0%
Project assignments	50.0%	60.0%

Recommended reading	Basic literature	Wegner, P.: Why interaction is more powerful than algorithms. Communications of the ACM, May 1997, Vol. 40, No. 5, str. 80-91. Defense Modeling and Simulation Office (DMSO): https://www.dmso.mil/public/ Sandeep Singhal, S., Zyda, M.: Networked Virtual Environments: Design and Implementation, Addison-Wesley Professional, 1999 John Ashcroft, J., Daniels, D.J., Hart, S.V.: Crisis Information Management Software (CIMS) - Feature Comparison Report, http://www.ojp.usdoj.gov/terrorism/whats_new.htm
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	• Extrapolation, filtration and smoothing in a distributed system. • Extrapolation with time synchronization in the presence of delays. • Negotiation and collaboration of agents in a virtual scene. • Autonomous objects - machine learning and control mechanisms. • Optimization of load of the network and nodes in a virtual reality system.	
Work placement	Not applicable	