GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Virtual Collaboration Teams, PG_00047887		
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	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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	2.0
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	

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	2.0	18.0	50

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_W44] knows and understands, to an advanced extent, architecture, design principles and methods of hardware and software support for local and distributed information systems, including computing systems, databases, computer networks and information applications, as well as the principles of human-computer interaction, the operation and evaluation criteria of data processing, storage and transfer methods, including computational algorithms, artificial intelligence and data mining as well as standards and methods of IT systems administration, monitoring of processes and robustness to undesirable phenomena and activities	Students have practical experience in implementing systems supporting collaborative work using interactive components in a distributed fashion.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	Students know the current perspectives and limits of systems that integrate human and system activities in a cybersphere.	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K6_U12] is able, to an advanced degree, to analyze the operation of components and systems related to the field of study, and to measure their parameters and study their technical characteristics, as well as to plan and carry out experiments related to the field of study, including measurements and computer simulations, and to interpret the obtained results and draw conclusions	Students can implement on their own an agent-based application that meets the given requirements using various programming platforms and protocols available on the Internet.	[SU3] Assessment of ability to use knowledge gained from the subject [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

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

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3"></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>Final test</td><td>50.0%</td><td>40.0%</td></tr>
<tr><td>Project assignments</td><td>50.0%</td><td>60.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">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</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">No requirements</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">• 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.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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