GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Virtual Team Collaboration, PG_00049212		
Field of study	Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	February 2023	Academic year of realisation of subject	2023/2024
Education level	second-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	2	Language of instruction	English
Semester of study	3	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Computer Communications -> 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	4.0	16.0	50

Subject objectives

1. Present non-algorithmic computation models for group work in a distributed environments
2. Present new trends in the development of IT applications for the needs of the information society
3. Demonstrate in practice several applications representing the main classes of distributed interactive systems

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_K01] is ready to create and develop models of proper behaviour in the work and life environment; undertake initiatives; critically evaluate actions of their own, teams and organisations they are part of; lead a group and take responsibility for its actions; responsibly perform professional roles taking into account changing social needs, including:n - developing the achievements of the profession,n- observing and developing rules of professional ethics and acting to comply to these rulesn	Students know the current development possibilities of applications that integrate the activities of people and systems in virtual space, decision-making mechanisms in risk conditions, and open agent system organization models forcing coordination of conflicting agents.	[SK5] Assessment of ability to solve problems that arise in practice
[K7_W02] Knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study	Students know non-algorithmic calculation models for group work in a distributed environment, in particular open agent systems	[SW1] Assessment of factual knowledge
[K7_U02] can perform tasks related to the field of study as well as formulate and solve problems applying recent knowledge of physics and other areas of science	Students are able to optimize the activities of agents due to the dynamically changing contexts of agent performance (memory resources, network properties).	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

<table>
<tr><td>Subject contents</td><td>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 networked games.
21. State sharing techniques
22. Dead reckoning protocols
23. State convergence techniques</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project assignments</td><td>50.0%</td><td>60.0%</td></tr>
<tr><td>Final exam</td><td>50.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>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</td></tr>
<tr><td>Supplementary literature</td><td>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>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>• Extrapolation, filtration and smoothing mechanisms in distributed environments
• Extrapolation with time synchronization in case of delays
• Negotiation and cooperation mechanisms of virtual reality participants
• Autonomous objects - learning and control mechanisms
• Optimization of network load and individual nodes in virtual reality environments</td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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