



## Subject card

Subject name and code	Virtual Collaboration Teams, PG_00047887						
Field of study	Informatics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
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 -> Wydziały Politechniki Gdańskiej						
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.	[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects
	[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.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject
	[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	<ol style="list-style-type: none"> <li>1. Space sharing techniques</li> <li>2. Distributed interactive simulation</li> <li>3. Algorithmic vs. interactive model of computations</li> <li>4. Closed and open agent systems.</li> <li>5. Implementability of negotiations, agent rationality.</li> <li>6. Distributive and integrative bargaining</li> <li>7. Classes of coordination tasks.</li> <li>8. Classes of negotiation strategies.</li> <li>9. Regressive out-guessing problem.</li> <li>10. Socially inspired solution patterns.</li> <li>11. Game state space.</li> <li>12. Bounded rationality of agents</li> <li>13. Coordination problems in game theory</li> <li>14. Pareto optimality and Nash equilibrium</li> <li>15. Prospect theory vs. utility theory</li> <li>16. Networked virtual environments</li> <li>17. Object-event architectures (SIMNET, DIS)</li> <li>18. State prediction: dead-reckoning, ghost-objects</li> <li>19. High Level Architecture standard: federation, federates, RTI</li> <li>20. Generations of network games.</li> <li>21. State sharing techniques</li> <li>22. Dead reckoning protocols</li> <li>23. State convergence techniques</li> </ol>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project assignments	50.0%	60.0%
	Final test	50.0%	40.0%

Recommended reading	Basic literature	<p>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): <a href="https://www.dmsomil/public/">https://www.dmsomil/public/</a></p> <p>Sandeep Singhal, S., Zyda, M.: Networked Virtual Environments: Design and Implementation, Addison-Wesley Professional, 1999</p> <p>John Ashcroft, J., Daniels, D.J., Hart, S.V.: Crisis Information Management Software (CIMS) - Feature Comparison Report, <a href="http://www.ojp.usdoj.gov/terrorism/whats_new.htm">http://www.ojp.usdoj.gov/terrorism/whats_new.htm</a></p>
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• Extrapolation, filtration and smoothing in a distributed system.</li> <li>• Extrapolation with time synchronization in the presence of delays.</li> <li>• Negotiation and collaboration of agents in a virtual scene.</li> <li>• Autonomous objects - machine learning and control mechanisms.</li> <li>• Optimization of load of the network and nodes in a virtual reality system.</li> </ul>	
Work placement	Not applicable	

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