



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 2024	Academic year of realisation of subject			2024/2025		
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	<ol style="list-style-type: none">1. Present non-algorithmic computation models for group work in a distributed environments2. Present new trends in the development of IT applications for the needs of the information society3. Demonstrate in practice several applications representing the main classes of distributed interactive systems						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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).		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	[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_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 rules		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		

Subject contents	<ol style="list-style-type: none"> 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 											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Final exam</td> <td>50.0%</td> <td>40.0%</td> </tr> <tr> <td>Project assignments</td> <td>50.0%</td> <td>60.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Final exam	50.0%	40.0%	Project assignments	50.0%	60.0%
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Final exam	50.0%	40.0%										
Project assignments	50.0%	60.0%										
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.</p> <p>Defense Modeling and Simulation Office (DMSO): https://www.dmsomil/public/</p> <p>Sandeep Singhal, S., Zyda, M.: Networked Virtual Environments: Design and Implementation, Addison-Wesley Professional, 1999</p>										
	Supplementary literature	<p>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</p>										
	eResources addresses	Adresy na platformie eNauczanie:										
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • 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 											
Work placement	Not applicable											