Bialystok University of Technology									
Field of study	**Computer Science**							**Degree level and programme type**	**Engineer's degree full-time programme**
Specialization/ diploma path	---							**Study profile**	academic
Course name	**Informatics in Robotics**							**Course code**	**FCS-00008**
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	**Semester**	1
	10				20			**No. of ECTS credits**	**6**
Entry requirements									
Course objectives	Lectures: To familiarize students with the basics of robotics. Developing a broad perspective on problems related to the work of robots in real conditions. Practical classes: Implementation of navigation algorithms on real mobile constructions based on Mindstorms NXT educational robots. Designing the behavior of mobile systems.								
Course content	Lectures: Basics of robotics: simple and inverse kinematics. Sensors and motors in robotics. PID control. Navigation algorithms. Programming mobile robots to perform navigation tasks: avoiding obstacles, location, mapping, SLAM. Intelligent Robots. Practical classes: Not eXactly C (NXC). Testing various sensors and engines. Conditions, loops, threads in parallel. Mindstorms NXT programming. Real robot control - avoiding obstacles. Covering the distance with many obstacles of unknown dimensions. Graphic information recognition. Implementation of space orientation algorithms.								
Teaching methods	informative lecture, lecture problem, programming,								
Assessment method	Lecture - tests. Practical classes - work during the classes, reports from the classes.								

Symbol of learning outcome	Learning outcomes	Reference to the learning outcomes for the field of study
LO1	understands the tasks of kinematics in robotics and can solve simple kinematics tasks	K_W02 K_W04
LO2	understands and implements mobile navigation algorithms	K_W04 K_W05 K_U05 K_U06
LO3	designs and implements two robot communications	K_U09
LO4	tests the accuracy and effectiveness of mobile systems in various conditions.	K_U06
Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	test	L
LO2	test, reports	L, Sw
LO3	reports	Sw
LO4	reports	Sw

Student workload (in hours)		No. of hours
Calculation	1 - Participation in lectures -	10
	2 - Participation in practical classes -	20
	3 - Preparation to the lecture -	10
	4 - Implementation of project tasks (including preparation of presentations) -	105
	5 - Participation in teachers hours -	5
	TOTAL:	**150**

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	35 (1)+(2)+(5)	1.4
Student workload – practical activities	125 (2)+(4)	5.0

Basic references	1. R. Murphy, Introduction to AI robotics, The MIT Press Cambridge, Massachusetts London, England, 2000. 2. B. Z. Sandler, Robotics Designing the Mechanisms for Automated Machinery, Elsevier Inc. 1999. 3. T. Bajd, M. Mihelj, J. Lenarcic, A. Stanovnik, M. Munih, Robotics, Springer, 2010.
Supplementary references	1. S. Russell, P. Norvig, Artificial Intelligence: A Modern Approach, 2nd edition, Prentice Hall, 2002. 2. B. Siciliano, G. Oriolo, L. Sciavicco, L. Villani, Robotics Modelling, Planning and Control, Springer, 2009. 3. R. R. Murphy, Disaster robotics, Cambridge, London, 2014.
Organisational unit conducting the course	Department of Digital Media and Computer Graphics	**Date of issuing the programme**
Author of the programme	dr inż. Teodora Dimitrova-Grekow	Feb. 18, 2022

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW – field work, S – seminar