Bialystok University of Technology									
Field of study	**Computer Science**							**Degree level and programme type**	**Master's degree full-time programme**
Specialization/ diploma path	**Intelligent Internet Technologies**							**Study profile**	academic
Course name	**Informatics in Robotics**							**Course code**	**INF2IWR**
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	**Semester**	2,3
	15				30			**No. of ECTS credits**	**3**

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	INF2_W05
LO2	understands and implements mobile navigation algorithms	INF2_W03 INF2_U04
LO3	designs and implements two robot communications	INF2_U04 INF2_K01
LO4	tests the accuracy and effectiveness of mobile systems in various conditions.	INF2_U11 INF2_K01

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, Pc
LO3	reports	Pc
LO4	reports	Pc

Student workload (in hours)		No. of hours
Calculation	1 - Participation in lectures - 15x1h	15
	2 - Participation in practical classes - 15x2h	30
	3 - Preparation to the lecture -	5
	4 - Implementation of project tasks (including preparation of presentations) -	20
	5 - Participation in teachers hours -	5
	TOTAL:	**75**

Quantitative indicators	HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation	50 (1)+(2)+(5)	2.0
Student workload – practical activities	50 (2)+(4)	2.0

Basic references	1. J. J. Graig, Wprowadzenie do Robotyki, WNT, Warszawa, 1995. 2. R. Murphy, Introduction to AI robotics, The MIT Press Cambridge, Massachusetts London, England, 2000. 3. B. Siemiątkowska, A. Borkowski, R. Chojecki i in., Reprezentacja otoczenia robota mobilnego, Akademicka Oficyna Wydawnicza EXIT, 2011. 4. W. Kaczmarek, J. Panasiuk, S. Borys, Środowiska programowania robotów, PWN, 2017.
Supplementary references	1. K. Kozłowski, P. Dutkiewicz, W. Wróblewski, Modelowanie i sterowanie robotów, PWN, Warszawa, 2003. 2. S. Russell, P. Norvig, Artificial Intelligence: A Modern Approach, 2nd edition, Prentice Hall, 2002. 3. G. Dudek, M. Jenkin, Computational Principles of Mobile Robotics, Cambridge University Press, 2000. 4. T. Zielińska, Maszyny kroczące: podstawy, projektowanie, sterowanie i wzorce biologiczne, PWN, 2013.
Organisational unit conducting the course	Department of Digital Media and Computer Graphics
Author of the programme	dr inż. Teodora Dimitrova-Grekow

(Organisational unit row — Date of issuing the programme: [blank])
(Author of the programme row — May 22, 2020)

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