Bialystok University of Technology, Faculty of Mechanical Engineering									
Field of study	*Mechatronics*							**Degree level and programme type**	*first-cycle (BSc, Eng) full-time studies*
Specialization/ diploma path	*Intelligent structures*							**Study profile**	*academic*
Course name	*Intelligent systems in buildings- Smart Home*							**Course code**	*IS-FME-00214S*
								Course type	*elective*
Forms and number of hours of tuition	**L**	**C**	**LC**	**P**	**SW**	**FW**	**S**	**Semester**	*summer*
	30		*15*	*15*				**No. of ECTS credits**	*5*
Entry requirements	*Fundamentals of electrical engineering and electronics; Measuring and control signals*								
Course objectives	*Students learn the latest trends related to the control of devices in single-family and multi-family buildings and in industrial plants. During the course, students learn the principles of communication, network structure and principles of controlling of actuators. Intelligent installations allow to control lighting, heating, ventilation and window covers, thus economically managing electricity. Intelligent installations can also - thanks to magnetic readers - open doors without the use of keys, as well as control devices outside the house - garage doors, wickets, outdoor lighting, cameras, garden sprinklers or fountains.*								
Course content	*Lecture: Historical overview of intelligent systems in buildings. Types of control standards in intelligent buildings. Communication between individual devices. Types, construction and principles of operation of sensors and actuators. Electric power supply of individual devices in intelligent buildings. Central units for system controlling, internal and external communication. Data collection and archiving. Network hierarchy, configuration and programming principles of intelligent systems. Network security and access rights to the particular functions. Security aspects and access control.* *Laboratory classes: configuring, launching and testing a selected intelligent system.* *Project classes: designing an intelligent installation in a single-family house.*								
Teaching methods	*Information and problem lecture; Laboratory classes; Project classes*								
Assessment method	*Lecture: two tests; Laboratory classes: evaluation of: self-preparation tests on specified issues before they are discussed during the course, students' reports, students' participation in discussions and their activity during classes; Project classes: evaluation of: students' projects, their ongoing work progress, participation in discussions and students' activity during classes*								

Symbol of learning outcome	**Learning outcomes** **Students who successfully complete the course:**	**Reference to the learning outcomes for the field of study**
LO1	*have the knowledge of the construction and operation of intelligent systems*	*MK1_W06*
LO2	*have the knowledge of development trends in intelligent systems*	*MK1_W09*
LO3	*have the knowledge of the operation of electronic components and electrical devices*	*MK1_W03, MK1_W04*
LO4	*can develop and present technical documentation of intelligent devices and systems*	*MK1_U02, MK1_U03*
LO5	*can design, configure, program and test intelligent systems assembled from standard components*	*MK1_U03, MK1_U05, MK1_U07*

Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	*Lecture: two tests;*	*L*
LO2	*Lecture: two tests;*	*L*
LO3	*Lecture: two tests;*	*L*

LO4	*Laboratory classes: evaluation of: self-preparation tests on specified issues before they are discussed during the course, students' reports, students' participation in discussions and their activity during classes; Project classes: evaluation of: students' projects, their ongoing work progress, participation in discussions and students' activity during classes*	*LC, P*
LO5	*Laboratory classes: evaluation of: self-preparation tests on specified issues before they are discussed during the course, students' reports, students' participation in discussions and their activity during classes; Project classes: evaluation of: students' projects, their ongoing work progress, participation in discussions and students' activity during classes*	*LC, P*

Student workload (in hours)		**No. of hours**
Calculation	*Participation in lectures*	*30*
	Participation in laboratory classes	*15*
	Participation in project classes	*15*
	Preparation for passing the lecture	*15*
	Preparation for laboratory classes	*13*
	Preparation for passing laboratory classes	*3*
	Preparation for project assignments	*19*
	Completion of project assignments (including preparation of presentations)	*5*
	Preparation for passing project assignments	*6*
	Participation in consultations	*4*
	TOTAL:	*125*

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	*64*	*2.6*
Student workload – practical activities	*78*	*3.1*

Basic references	*1. Niezabitowska E. (ed.)., Budynek inteligentny. Tom I. Potrzeby użytkownika a standard budynku inteligentnego. Wyd. Politechnika Śląska, 2014.* *2. Niezabitowska E. (ed.)., Budynek inteligentny. Tom II. Podstawowe systemy bezpieczeństwa w budynkach inteligentnych. Wyd. Politechnika Śląska, 2014.* *3. Kwaśniewski J., Inteligentny dom i inne systemy sterowania w 100 przykładach, Wyd. BTC, Legionowo 2015.* *4. Schwartz M., Arduino: automatyka domowa dla każdego: inteligentne budynki dla pasjonatów elektroniki. Helion, Gliwice 2015.*
Supplementary references	*1. Parol M., Rokicki Ł., Instalacje i systemy w inteligentnych budynkach, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2017.* *2. Riley M., Inteligentny dom. Automatyzacja mieszkania za pomocą platformy Arduino, systemu Android i zwykłego komputera. Helion 2013.* *3. Miller M., Internet rzeczy, PWN 2016.* *4. Guinard D. D., Internet rzeczy: budowa sieci z wykorzystaniem technologii webowych i Raspberry Pi. Helion, Gliwice 2017.*

Organisational unit conducting the course	*Department of Automatic Control and Robotics*	**Date of issuing the programme**
Author of the programme	*Kazimierz Dzierżek, PhD, Eng*	*24.04.2019*

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