POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name

Programming of automation systems

Course

Field of study	Year/Semester
Mechatronics	1/2
Area of study (specialization)	Profile of study
Mechatronic Constructions	general academic
Level of study	Course offered in
Second-cycle studies	english
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
0	30	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:	Responsible for the course/lecturer:
Prof. DSc. PhD. Eng. Andrzej Milecki	

Prerequisites

Basic knowledge of mathematics, computer science, programming languages. Computer skills, Windows operating system and C++ / C# programming skills, building simple algorithms using the basic elements of the C++ / C# language. Awareness of the need to expand knowledge and skills. Ability to comply with the rules in force during laboratory classes, the ability to communicate with the closest environment during classes.

Course objective

Getting to know the basics of object-oriented programming, acquiring skills in using classes and structures in programming. Acquire the skills to build simple window applications in Windows. The ability to use the RS232 communication protocol to connect an external device with a microprocessor. Building simple graphic visualizations based on the Open GL graphic processor.

Course-related learning outcomes

Knowledge

Has expanded knowledge of control, including the description of pulse and nonlinear systems, Z transformation, pulse and nonlinear control, linearization methods, and testing stability of pulse and nonlinear systems. Has basic knowledge about the selection of control elements of impulse and nonlinear systems. - [K_W05]

Has extensive knowledge of programming in languages: C++ / C#. He also has basic knowledge about the construction, operation, programming and use of signal processors. - [K_W08]

Has extended knowledge of mechatronics about the knowledge of analysis and design of complex mechatronic systems, theory and technique of systems, and about the use of modelling and simulation in mechatronic design. - [K_W09]

Has extended knowledge of computer science with knowledge of systems real-time operations, programming tasks concurrent signal processing algorithms and control, basics of image processing and analysis, and o or preparing documentation and quality assurance software. - [K_W10]

Skills

Ability to obtain information on mechatronics from the Internet, library and reading room as well as from other resources. In particular, he can correctly indicate the sources of information needed. - [K_U01]

Ability to write an application program in C++ / C#. Is able to write and use programs used for design, analysis, simulation and control. - [K_U07]

Has the skills to use IT tools in the acquisition and integration of information, design and control of mechatronic devices. - [K_U08]

Social competences

Understanding the requirement of learning by whole life; ability to inspire and organize learning process of other people. - [K_K01]

Is aware of the role of electronics in modern economy and its importance for the development of society and the environment. - [K_K02]

Ability to think and act in a creative and enterprising way. -[K_K04]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Credit based on reports from laboratory exercises consisting of questions and tasks to be performed. Rating scale 51-60% points - C (3.0), 61-70% points – C+ (3.5), 71-80% points B (4.0), 81-90% of points - B+ (4.5), 91-100% points – A (5.0).

Rewarding practical knowledge gained during previous laboratory exercises.

Practical checking of object-oriented programming skills.

Assessment of knowledge and skills related to the implementation of individual and group tasks during the laboratory.

Getting extra points for activity during classes, especially for:

- ability to work as part of a team that practically performs a specific task in a laboratory,
- performing additional tasks,
- aesthetic care of completed projects.

Programme content

Object-oriented programming. Programming using the C++ / C# language, building simple window applications. Using the RS232 communication protocol to communicate with external devices. Knowledge of parameters and communication protocol. Handling thread receiving and sending messages. Data Acquisition. Programming using the Open GL graphics processor. Construction of an application that visualizes the movement of a selected industrial robot configuration in a virtual environment.

Teaching methods

Instructions, presentations

Bibliography

Basic

1. S. Prata , C++ Primer Plus

2. S. Meyers, Effective C++

2. A. Troelsen, J. Philip, Pro C# 7: With .NET and .NET Core

3. Course Open GL www.Nehe.gamedev.net

Additional

1. Technical data on internet, datasheets etc.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)[1]	20	1,0

[1] delete or add other activities as appropriate