

Faculty of Computer Science

Courses available for incoming Erasmus+ students

Course name	Content	ECTS credits	Teacher	Remarks /semester
Digital logic	The course covers basic concepts needed to understand and design digital logic circuits. Laboratory exercises cover fundamental concepts and performing simple operations on the FPGA boards, like using switches and controlling LEDs and seven-segment displays. Subsequent exercises progress to more advanced topics such as arithmetic circuits, flip-flops, counters, state machines, memories, data paths, and simple processors. The exercises are performed using the Verilog hardware description language in the Quartus Prime Design Software.	5	dr hab. inż. Agnieszka Lazarowska	
Microcontrollers programming	The course covers basics of microcontrollers programming in C language, description of the functions of a processor, the functions of its components, registers, the processor memory map, explanation of the concept of alternative functions of digital inputs/outputs, the functions and meaning of pull-up resistors used in I/O pins, handling digital inputs/outputs, development of software for embedded systems with support for typical peripherals: timers/counters including CTC, input capture and pulse-width modulation modes, different types of interrupts, the concepts of serial communication: UART, SPI and I2C communication protocols.	5	dr hab. inż. Agnieszka Lazarowska	
PLC programming	The subject covers programming Siemens S7-1500 programmable controllers in the TIA Portal environment. The programming languages used are LAD, GRAPH and SCL.	5	dr inż. Monika Rybczak	

	Depending on the level of the group, classes may involve starting a technological process using input signal dependencies to activate the appropriate executive devices.			
Robotic Systems Programming	The course covers programming in ROS2 based on a Virtual Machine running Ubuntu with sensors, Lidar and motor like Dynamixel. Programming will be verified in Gazebo/Rviz/Matlab simulations and on real mobile robots.	5	dr inż. Monika Rybczak	
Internet of Things	Building simple IoT systems using microcontrollers, sensors, and display components. Focus on the basics of device communication and control of mobile robotic platforms.	5	mgr inż. Krystian Kozakiewicz	
Digital Twin Technology	Students will learn about the possibilities of digital twin programming based on cooperation with a real controller and a 3D environment. Work in the Factory IO, Real Engine and SIMIT environments. The work will involve checking the dependencies between the programme and the environment, which should work in accordance with the expected operation of the devices in real conditions.	5	dr inż. Monika Rybczak	