

Title:	Automation and robotics in polymer processing
Lecture hours:	15 hours of lecture and 15 hours of project
Study period: (summer/winter)	summer/winter
Number of credits:	4
Assessment methods:	Final test
Language of instruction:	English
Prerequisites:	Materials
Course content:	<p>Basic knowledge of electronics and automation is lectured: linear algebra, Boolean algebra, information technology and programming basics. Basic knowledge of measuring current, voltage, resistance etc.</p> <p>Concept of automation, automatic control system, example systems. Controllers: tasks of controllers, types and properties of controllers, continuous PI/PID controllers. Basic concepts of robotics, types and general construction of robots, tasks of industrial robots (e.g. in polymers procesing).</p> <p>Construction and principle of operation of programmable logic controllers (PLCs), controller duty cycle, controller input and output circuits, programming languages, fundamentals of programming in LAD and FBD. Construction and principle of operation of selected sensors and measuring devices used in automation and robotics.</p> <p>Creation of technical documentation based on CAM/CAD type software is discussed. Use of numerical machines (laser plotters, CNC milling machines). Electronic circuit design, PCB prototyping, assembly and commissioning. Programming of microcontrollers and PLCs. Measurement of physical quantities in control systems. Creation of control applications for drives, servos, actuators, depending on input signals (digital and analogue).</p>
Learning outcomes:	<p>The student characterises the individual components of industrial automation systems. The Student recognises their functions and purpose.</p> <p>The student is able to work with technical documentation of devices and technological lines. The Student is able to design a device, make a prototype, program and start it up. Can write a simple application for a PLC and microcontroller. Can transfer software to a device.</p> <p>The student is able to apply the acquired knowledge in industry (e.g. plastics processing). Can make changes to control systems, find faults and rectify them.</p>
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