Applied Automatization II

Code: MK3AAUT2R06RX17-EN

ECTS Credit Points: 6

Evaluation: Mid-Semester Grade

Year, Semester: 3rd year, 1st semester

Its prerequisite(s): Applied Automatization I

Further courses are built on it: Yes/<u>No</u>

Number of teaching hours/week (lecture + practice): 0+6

Topics:

The most important industrial communication protocols are presented. Theoretical and practical relations PLC Modbus, CAN-bus, EtherCAT, PROFINET, TCP / IP protocol. The basic realization of the network connections of different communication architectures. Configure the listed industrial communication protocols. Getting to know a single programming environment, programming languages and typical features (Ladder Diagram (LD), structured text (ST), Function Block Diagram (FBD), Instruction List (IL) and Sequential function chart (SFC). Are different types of presentations resolution PLC (Phoenix Contact, FESTO, BECHOFF) and internal structures of the main lines of programming. Practical programming in which logic functions, timer devices, counting devices, analog control problems must be implemented both in theory and practice. Modelling real industrial processes.

Literature:

Compulsory:

- Ed. Robert H. Bishop: The Mechatronics Handbook, Section IV: Systems and Controls, CRC Press; 2nd edition 2007, ISBN: 978-0849392573
- Uday A.Bakshi, S.C.Goyal: Feedback Control Systems,Technical Publications Pune, 2nd edition 2008, ISBN: 978-8189411077

Recommended:

- Uday.A.Bakshi,Varsha.U.Bakshi: Control System Engineering, Technical Publications Pune, 1th edition 2008, ISBN: 978-8184314632

Schedule

1st week Registration week	
2nd week:	**3rd week:**
Lecture: -	**Lecture:** -
Practice: Introduction, Software, Hardware, Installation.	**Practice:** Configure industrial communication protocols.
4th week:	**5th week:**
Lecture: -	**Lecture:** -
Practice: Getting to know a single programming environment, programming language features and characteristics.	**Practice:** Implement basic network connections on different communication architectures.
6th week:	**7th week:**
Lecture: -	**Lecture:** -
Practice: Theoretical and practical relationships Modbus programming practice.	**Practice:** Theoretical and practical connections CANbus programming practice.

8th week 1st drawing week, 1st Mid-term test

9th week:	10th week:
Lecture: -	**Lecture:** -
Practice: Theoretical and practical connections EtherCAT, programming practice.	**Practice:** Theoretical and practical connections PROFINET programming practice.
11th week:	**12th week:**
Lecture: -	**Lecture:** -
Practice: Theoretical and practical connections TCP / IP programming practice.	**Practice:** Modeling industrial processes.
13th week:	**14th week:**
Lecture: -	**Lecture:** -
Practice: Managing Real Industrial Processes.	**Practice:** Complex management of industrial processes.

15th week 2nd drawing week, 2nd Mid-term test

Requirements

A, for a signature:

Participation at practice classes is compulsory. A student must attend the practice classes and may not miss more than three times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. A student can't make up a practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. Missed practice classes must be made up for at a later date, being discussed with the tutor. Active participation is evaluated by the teacher in every class. If student's behaviour or conduct doesn't meet the requirements of active participation, the teacher may evaluate his/her participation as absence because of the lack of active participation in class.

B, for a grade:

Students have to complete a mid-term exercise at least for 50% to take part on the next practice classes. All students, who failed the mid-term exercise will not get a mid-semester grade. At the end of the semester, all students have to solve a real life problem in programming. Also a task, to make a complete documentation of the project file, using all the methods, mentioned during the semester. The course ends in a mid-semester grade. Based on the average of the grades of the tasks. The grade for the test is given according to the following table: Score Grade 0-50 fail (1) 51-65 pass (2) 66-75 satisfactory (3) 76-85 good (4) 86-100 excellent (5)