DEPARTMENT OF MECHATRONICS ENGINEERING

Course Details						
Code			**Academic Year**		**Semester**	
MEC 002			2		WiSe	
Title			**T**	**A**	**L**	**ECTS**
Applied Control Engineering			2	1	2	6

Language	English				
Level	**Undergraduate**	✓	**Graduate**	**Postgraduate**	
Department / Program	Mechactronics Engineering				
Forms of Teaching and Learning	Formal				
Course Type	**Compulsory**		**Elective**	✓	
Objectives	**Knowledge:** Students acquire basic knowledge in the field of applied control engineering. They will be able to assess the technical properties and interrelationships of switching elements, sensors, drives and controls. **Skills:** Students are able to select, assess and design individual automation components and processes and to integrate them into automated systems. They independently develop and evaluate solutions in the field of control engineering and other automation technology problems. **Competencies:** Students are able to independently place the acquired knowledge and skills in the context of selected areas of specialisation and to present them to their fellow students in an understandable and effective way. They analyse existing solutions and identify possible new approaches for automation components and systems with regard to social, economic and ecological aspects.				
Content	• Description of control tasks with requirement and functional specifications. • Design, construction and testing of control systems on the basis of requirement and functional specifications. • Dimensioning and selection of necessary control components to solve an automation task • Use of sensors, switching and display components, regulated drives and controls used in industrial production for control systems. • Wiring and networking of the components on a rack • Operation of the software and programming of the fieldbus interfaces with practical implementation.				
Prerequisites	Analysis and Linear Algebra I (Math I), Physics I, Analysis and Linear Algebra II (Math II), Electrical Engineering I, Computer Science I/II, Metrology I				
Coordinator					
Lecturer(s)	Prof. Dr.-Ing. Hasan Smajic, Asst. Prof.Dr.-Ing. Abdulkadir Sanli				
Assistant(s)	B.Sc. Ferit Tiryaki				
Work Placement					

Recommended or Required Reading

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Books / Lecture Notes	Script in electronic form https://www.isis.tu-berlin.de/
Other Sources	

Additional Course Material

Documents	
Assignments	
Exams	

Course Composition

Mathematics und Basic Sciences		10 %
Engineering		30 %
Engineering Design		60 %
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	40
Quiz		
Assignments		
Attendance		
Recitations		
Projects	1	20
Final Exam	1	40
Total		**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	15	1	15
Self-Study			
Assignments	1	1	1
Presentation / Seminar Preparation	1	1	1
Midterm Exam	1	2	2
Recitations	15	4	60
Laboratory			
Projects			

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Final Exam	1	2	2
Total Work Load			**81**
ECTS Points (Total Work Load / Hour)			**6**

Learning Outcomes	
1	
2	
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12	

Weekly Content	
1	Introduction to applied control technology I
2	Introduction to applied control technology II
3	Organizational structure in control levels
4	Phases of the development process
5	Description means for control functions
6	Measurement and data acquisition
7	Power transmission with electric drive technology
8	Positioning and speed control with drives
9	**- Midterm Exam-**
10	Processing of the process data with a PLC I
11	Processing of the process data with a PLC II
12	Programming the programmable logic controller
13	Operation and visualization of processes
14	Data transmission with fieldbuses
15	Machine safety

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Contribution of Learning Outcomes to Program Objectives (1-5)							
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
1							
2							
3							
4							
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10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
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