TÜRK-ALMAN ÜNIVERSITESI
TÜRKISCH-DEUTSCHE UNIVERSITÄT

MECHATRONICS ENGINEERING
COURSE SYLLABUS

Course Details						
Code			**Academic Year**		**Semester**	
MEC426			4		Fall	
Dersin Adı			**T**	**A**	**L**	**ECTS**
Production automation project II			1	-	4	6

Language	German				
Level	**Undergraduate**	✓	**Graduate**		**Postgraduate**	
Department / Program	Mechatronics Engineering				
Forms of Teaching and Learning	Face-to-face lecture, group work, personal study.				
Course Type	**Compulsory**	✓	**Elective**		
Objectives	The "Production Automation" project deals with the possible uses of sensor-based control of industrial robots, production systems and equipment. The aim is to design and implement a system for status recognition and object tracking in group work. Here, the students will work in groups on an experimental robot controlled by a camera, a production plant or equipment to work out the basics of connecting camera systems, image processing, object recognition and control. It is also important that the knowledge acquired is competently incorporated into the group performance. In addition, the importance of content-related and organizational interfaces within the framework of the work on the overall topic of the project should be deepened. The students acquire knowledge of: - Use cases of industrial automation technology - Programming of PLC, Arduino, Raspberry PI - Basics of signal analysis, image and pattern recognition - Solution-oriented thinking and acting in group work Field Education: 20% Method Education: 20% Integrated system training: 30% Social Skills Training: 30%				
Content	Lecture: - Project planning from the offer phase to the complete commissioning of the control in a complex industrial automation system - Application of engineering methods to a specific system of automation technology - Sensor technology, controls, measurement data acquisition and analysis in the field of industrial robotics, production systems and equipment - Basics of GUI and human-machine interfaces laboratory: - Selection and integration of sensors				

MECHATRONICS ENGINEERING
COURSE SYLLABUS

	- Interface programming / adaptation and system integration
	- Signal analysis, image and pattern recognition with Python, C / C ++
	- PLC, Arduino and Raspberry PI programming
	Design and programming of human-machine interfaces
Prerequisites	None
Coordinator	Doç. Dr. Tuba ÇONKA YILDIZ
Lecturer(s)	Doç. Dr. Tuba Çonka YILDIZ, Dr.-Ing Soner Emeç, Dr. Öğr. Üyesi Ali Can Kaya, Prof. Anatoli Makarov
Assistant(s)	MSc. Fatih ÇÖGEN, MSc. Mustafa Hakan SANDIK, MSc. Ali KORUCU, MSc. Merve Teke Budaklı, MSc. Onur Akgün, BSc. Oğuzhan Memişoğlu, BSc. Bilge Kağan Dönmez
Work Placement	None

Recommended or Required Reading	
Books / Lecture Notes	• "Basics of automation" sensor technology, regulation, control Author: Berthold Heinrich, Petra Linke, Michael Glöckler • "Mechatronics" basics and applications of technical systems Author: Horst Czichos • "PLC programming in instruction list according to IEC 61131-3" A systematic and action-oriented introduction to structured programming Author: Hans-Joachim Adam, Mathias Adam
Other Sources	Exercise prints available in electronic form

Additional Course Material	
Documents	-
Assignments	-
Exams	-

Course Composition		
Mathematics und Basic Sciences		%
Engineering		%
Engineering Design	40	%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge	60	%

Assessment		
Activity	**Count**	**Percentage (%)**
Midterm Exam	1	30
Quiz	0	0
Assignments	0	0

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MECHATRONICS ENGINEERING
COURSE SYLLABUS

Attendance	0	0
Recitations	0	0
Projects	1	30
Final Exam	1	40
Toplam		**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	1	75	75
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	5	5
Recitations			
Laboratory			
Projects	1	50	50
Final Exam	1	10	10
Total Work Load			**168**
ECTS Points (Total Work Load / 28)			**6**

Learning Outcomes

1	Design of industrial automation system
2	System design, optimization, integration, verification and risk analysis
3	Image and pattern recognition with Python and C / C ++
4	PLC, Arduino and Raspberry PI programming
5	Consolidation of practical knowledge of control engineering
6	Basics of industrial production systems and equipment
7	
8	
9	
10	
11	
12	

Weekly Content

1	Project presentation, project division and project planning

MECHATRONICS ENGINEERING
COURSE SYLLABUS

2	Project presentation, project division and project planning
3	Specifications and specifications
4	Specifications and specifications
5	Basics of systems engineering processes according to the standard ISO / IEC / IEEE-15288 "Systems and Software Engineering"
6	Basics of systems engineering processes according to the ISO / IEC / IEEE-15288 "Systems and Software Engineering" standard
7	IoT basics: bus systems, interfaces and sensor networks
8	IoT basics: bus systems, interfaces and sensor networks
9	IoT basics: bus systems, interfaces and sensor networks
10	Introduction of time series analysis and pattern recognition as well as tools
11	Introduction of time series analysis and pattern recognition as well as tools
12	Automatic key figure acquisition, analysis and graphical representation
13	Automatic key figure acquisition, analysis and graphical representation
14	Automatic key figure acquisition, analysis and graphical representation

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1	5	5	5				
2	5	5	5				
3	5	5	5				

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

Compiled by:	Fatih ÇÖGEN
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