DEPARTMENT OF MECHATRONICS ENGINEERING

Course Details				
Code	**Academic Year**			**Semester**
MEC425	3			SoSe
Title	**T**	**A**	**L**	**ECTS**
Production Automation Project I	1	-	4	6

Language	German					
Level	**Undergraduate**	✓	**Graduate**		**Postgraduate**	
Department / Program	Mechactronics Engineering					
Forms of Teaching and Learning	Formal, group work, selfstudy					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	The “Production Automation” project deals with the possible applications the sensor-based control of industrial robots, production systems and Resources. The aim is to create a system for status recognition and object tracking in group work to design and implement. Here, among other things, the students become one via camera-controlled experimental robots, production facilities or equipment in Group work the basics of connecting camera systems, image processing, develop object recognition and control. It is also important that the knowledge acquired is properly incorporated into the Group performance. In addition, the importance of content and organizational Interfaces as part of the work on the overall topic of the project are 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 ◆ Professional competence: %20 ◆ Methodological competence: %20 ◆ System competence: %30 ◆ Social competence: %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 - Sensors, controls, measurement data acquisition and analysis in the field of - Industrial robotics, production facilities and equipments - Basics of GUI and human-machine interfaces Laboratory: - Selection and integration of sensors - Interface programming / adaptation and system integration - Signal analysis, image and pattern recognition with Python, C / C ++ - MATLAB Applications - PLC, Arduino and Raspberry PI programming - Design and programming of human-machine interfaces					

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Prerequisites	INF030
Coordinator	Doç. Dr. Tuba Çonka YILDIZ, Dr.-Ing Soner Emeç, Dr. Öğr. Üyesi Abdülkadir Şanlı, Dr. Öğr. Üyesi Ali Can Kaya, Doç. Dr. Haydar Uncu
Lecturer(s)	Doç. Dr. Tuba Çonka YILDIZ, Dr.-Ing Soner Emeç, Dr. Öğr. Üyesi Abdülkadir Şanlı, Dr. Öğr. Üyesi Ali Can Kaya, Doç. Dr. Haydar Uncu
Assistant(s)	MSc. Fatih Çögen, MSc. Mustafa Hakan Sandık, MSc. Ali Korucu, MSc. Onur Akgün, MSc. Osman Taha Kütük, BSc. Oğuzhan Memişoğlu, BSc. Ebru Subutay
Work Placement	-

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	- Exercises are 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		
Quiz		
Assignments	1	20
Attendance		
Recitations		
Projects	1	20
Final Exam	1	60

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		Total	**100**
ECTS Points and Work Load			
Activity	**Count**	**Duration**	**Work Load (Hours)**
Lectures	14	2	28
Self-Study	14	4	56
Assignments	4	4	16
Presentation / Seminar Preparation	4	2	8
Midterm Exam			
Recitations			
Laboratory			
Projects	1	50	50
Final Exam	1	10	10
		Total Workload	**168**
		ECTS Points (Total Workload / Hour)	**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	PCB Design
8	3D Printer Design
9	MATLAB Applications
10	Robotic Operating System (Robot Operating System, ROS)

Weekly Content	
1	Determination of Subject of Project
2	Technical Research
3	Research Materials / Components
4	Research Techniques
5	Research Techniques
6	Application
7	Application

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8	Application
9	Prototypes
10	Prototypes
11	Changes / Challenges
12	Presentation of Results
13	Presentation of Results
14	Presentation of Results

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

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
1	5	4	4	3	5	3	3	4	5	4	4
2	5	4	4	3	5	3	3	4	5	4	4
3	5	4	4	3	5	3	3	4	5	4	4
4	4	5	4	5	5	3	4	4	5	5	5
5	5	4	4	3	5	3	3	4	5	4	4
6	5	4	4	3	5	3	3	4	5	4	4
7	4	5	4	5	5	3	4	4	5	5	5
8	5	4	4	3	5	3	3	4	5	4	4
9	5	4	4	3	5	3	3	4	5	4	4
10	4	5	4	5	5	3	4	4	5	5	5

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
https://obs.tau.edu.tr/oibs/bologna/progLearnOutcomes.aspx?lang=en&curSunit=196	
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