DEPARTMENT OF MECHATRONICS
COURSE SYLLABUS

Course Details						
Code				**Academic Year**		**Semester**
MEC319				3		5
Title				**T**	**A**	**L**	**ECTS**
Mechatronics Project				1	0	4	6

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Mechatronics					
Forms of Teaching and Learning	Lecture					
Course Type	**Compulsory**		**Elective**	**X**		
Objectives	After successfully passing the module, the students have extensive knowledge in the field of industrial automation technology, including the sub-areas: - Project work in interdisciplinary groups - Creation of project plan with work packages and milestones - Loads and function help for mechatronic projects - Project documentation with weekly reports - Presentation of the project content through presentations, posters, videos and animation - Independent processing of project content in the field of automation technology, robotics and 3D printing, image-based automation - Designing, constructing, manufacturing, assembling and controlling mechatronic systems - Microcontroller programming with Raspberry PI and Arduino - Validation of the mechatronic systems under performance and economic key figures - Expertise: 20% Methodological competence: 30% System competence: 30% Social skills: 20%					
Content	Project management, presentation of results and documentation					
Prerequisites	Recommended are: Analysis and Linear Algebra I (Maths I), Physics I, Analysis and Linear Algebra II (Maths II), Electrical Engineering I, Computer Science I/II, Measurement Technology I					
Coordinator	Dr. rer. Nat. Tuba ÇONKA YILDIZ					
Lecturer(s)	Dr.-Ing. Soner Emeç					
Assistant(s)	Onur Akgün, M.Sc., Ali Ömer Baykar M.Sc., Mustafa Hakan Sandık, M.Sc.					
Work Placement	None					

Recommended or Required Reading	
Books / Lecture Notes	- „Grundlagen Automatisierung“ Sensorik, Regelung, Steuerung Autor: Berthold Heinrich, Petra Linke, Michael Glöckler - „Mechatronik“ Grundlagen und Anwendungen technischer Systeme Autor: Horst Czichos - „SPS-Programmierung in Anweisungsliste nach IEC 61131-3“ Eine systematische und handlungsorientierte Einführung in die strukturierte Programmierung Autor: Hans-Joachim Adam, Mathias Adam

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	- Paul Alpar, Heinz Lothar Grob, Peter Weimann, Robert Winter: Anwendungsorientierte Wirtschaftsinformatik. Strategische Planung, Entwicklung und Nutzung von Informations- und Kommunikationssystemen. 5. überarbeitete und aktualisierte Auflage. Vieweg + Teubner, Wiesbaden 2008,
Other Sources	none

Additional Course Material	
Documents	„Leitfaden zum Projektmanagement“ ISO 21500 „Entwicklungsmethodik für mechatronische Systeme“ nach VDI 2206:2004-06
Assignments	-
Exams	-

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

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	20
Quiz		
Assignments	5	20
Attendance		
Recitations		
Projects	1	60
Final Exam		
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study			
Assignments			
Presentation / Seminar Preparation	2	12	24
Midterm Exam			
Recitations			

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Laboratory			
Projects	1	100	100
Final Exam			
		Total Work Load	**166**
		ECTS Points (Total Work Load / 28)	**6**

Learning Outcomes	
1	Entirety of management tasks, organization, techniques and resources for the initiation, definition, planning, control and completion of projects.
2	Selection and use of tools for project management software
3	Implementation of methods of agile project planning with Scrum
4	Set-up of V-model process model for quality assurance of the development and test phases.
5	Dealing with CAD tools e.g. SolidWorks, Inventor, AutoCAD, SketchUp
6	Dealing with circuit design and printed circuit board software Eagle, Altium, Proteus, DesignSpark
7	G-code programming for 3D printers
8	Construction-specific material selection and filament selection for 3D printers
9	Microcontroller programming with Raspberry PI and Arduino
10	Basics of control and regulation of mechatronic systems
11	Basics of image recognition

Weekly Content	
1	Introduction
2	Basics of project management and group division
3	Creation of project plan with work packages and milestones
4	Creation of loads and functions helps for the mechatronic project
5	Project documentation, presentation of the project content through presentations, posters and short videos
6	1. Intermediate presentation of the results: construction model and solution sketches
7	Specification of construction, electronic components, production planning
8	Prototype implementation. 3D printing of the components
9	2. Intermediate presentation of the results: Prototype construction with integrated electronics
10	Control design and microcontroller programming
11	Selected topics from robotics and image recognition
12	3. Intermediate presentation of the results: Prototype production, assembly and control
13	Elaboration of topic-specific applications from robotics, 3D printing, image recognition

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14	Methods of project validation and evaluation of mechatronic systems
15	Final presentation of the projects: prototypical demonstration of the project results

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

	P1	P2	P3	P4	P5	P6	P7
1	5	5	4	3	3	3	1
2	5	5	4	4	2	3	1
3	5	5	4	3	1	3	1
4	5	5	4	5	2	3	1
5	3	2	3	2	3	5	3
6	5	3	3	3	5	3	2
7	3	2	5	3	3	3	3
8	5	3	3	2	3	3	2
9	3	2	3	3	4	2	1
10	3	5	3	2	1	3	4
11	4	3	2	3	4	4	3
12	2	3	3	3	2	2	1

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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