COURSE SYLLABUS

Course Title	Course Code	Semester	Course Hour/Week		Credit	ECTS
Introduction to Arduino and Mechatronics	VCDE219	3	**Theory** 2	**Practice** 2	3	5
Course Type	Compulsory Course	Department Elective	Faculty Elective	University Elective	CoHE (YÖK) Elective	Other
	-	Yes	-	-	-	-
Level of Course	Associate Degree (Short Cycle)		Undergraduate (First Cycle)		Graduate/ Doctoral (Second /Third Cycle)	
	-		Yes		-	

Language of Instruction	English

Course Instructor(s)	Rihards Vitols	E-mail : rihards.vitols@arucad.edu.tr Office : TI OFF 07
Course Objectives	This course introduces students to the fundamentals of physical computing, electronics, and interactive systems using Arduino microcontrollers and basic mechatronics. Students will learn how to design, build, and program interactive objects and environments by combining hardware components such as sensors, motors, and actuators with software control. The course emphasizes hands-on experimentation, problem-solving, and creative applications of mechatronics in art, design, and interactive media. By the end of the course, students will be able to prototype functional interactive systems that respond to user input and environmental data.	

Course Learning Outcomes	**Students will able to:**	**Teaching Methods**	**Evaluation Methods**
	Students will be able to define core terminology of electronics and understand fundamental concepts of programming.	Direct instruction technique	Class Discussions

	Students will explain the basic components of the Arduino board bread board.	Class Discussions	Class Discussions
	Students will apply design principles and elements to create conceptual works, demonstrating creative problem-solving skills.	Design Projects	**Midterm:** Project work
	Students will examine Arduino programming language to identify the use of syntax elements and principles.	Class Discussions	Class Discussions
	Students will synthesize design concepts to produce original mechatronic, interactive works, showcasing their understanding of programming and creative processes.	Capstone Project	**Final:** Final project
Course Content	This course introduces students to the world of physical computing through Arduino, an open-source electronics platform. Designed for beginners, the program blends theory with hands-on practice, guiding learners step by step from basic concepts to building functional prototypes. Students will start by setting up the Arduino environment and writing their first programs. They will then explore how to control digital outputs (LEDs, motors), read inputs from sensors and buttons, and use analog signals for more complex interactions. Along the way, participants will gain skills in breadboarding, circuit design, and programming.		

COURSE OUTLINE/SCHEDULE			
Week	**Topic**	**Implementation (theory/practice)**	**Required Reading, Preliminary preparation**
1	Intro to Arduino board and software	T/P	
2	Digital outputs	T/P	Paper sculpture : fluid forms / Richard Sweeney. Sweeney, Richard, 1984
3	Digital inputs	T/P	Paper sculpture : fluid forms / Richard Sweeney. Sweeney, Richard, 1984
4	Analog inputs	T/P	Paper sculpture : fluid forms / Richard Sweeney. Sweeney, Richard, 1984
5	Analog outputs	T/P	Paper sculpture : fluid forms / Richard Sweeney. **Sweeney, Richard, 1984**

6	Finalizing assignments	T/P	Assignments need to be completed and be ready to present.
7	Midterm Exam / Peer review	T/P	
8	Buzzer & tone	T/P	Paper sculpture : fluid forms / Richard Sweeney. **Sweeney, Richard, 1984**
9	Exploring and analyzing mechatronic art and concepts	T	No readings required for this week
10	Temperature & environment services	T/P	Paper sculpture : fluid forms / Richard Sweeney. **Sweeney, Richard, 1984**
11	Servo motors	T/P	Paper sculpture : fluid forms / Richard Sweeney. **Sweeney, Richard, 1984**
12	Ultrasonic sensor	T/P	Paper sculpture : fluid forms / Richard Sweeney. **Sweeney, Richard, 1984**
13	Capacitive sensor	T/P	. Paper sculpture : fluid forms / Richard Sweeney. **Sweeney, Richard, 1984**
14	Final Project Pre-Production I	T/P	Teacher instructions and guidance
15	Final Exam Week	T	

Required Course Material(s) / Reading(s)/ Text Book(s)	**Library Catalogue number:** Paper sculpture : fluid forms / Richard Sweeney. Sweeney, Richard, 1984 TT870 .S947 2021 **Materials:** **https://www.robotzade.com/urun/arduino-super-baslangic-seti-2025-versiyon** **and** **https://www.robotzade.com/urun/sg90-rc-mini-9gr-servo-motor 2** **https://www.robotzade.com/urun/hc-sr04-ultrasonik-sensor 1**
Recommended Course Material(s)/ Reading(s) /Other	

ASSESSMENT		
Learning Activities	**NUMBER**	**WEIGHT in %**
Mid-Term	1	40
Quiz		
Assignment		
Project		
Field Study		
Presentation / Seminar		
Studio Practice		
Other	1	60
Contribution of Final Examination/Final Project/ Dissertation to the Final Grade		
TOTAL		100

	CONTRIBUTION OF COURSE LEARNING OUTCOMES TO PROGRAMME LEARNING OUTCOMES						
	PROGRAMME LEARNING OUTCOMES	Level of Contribution (1- lowest/ 5- highest)					
		1	2	3	4	5	
1	Knows the historical development of the field of communication, basic concepts, theories and research methods.		X				
2	Knows the principles and elements of basic design.		X				
3	Knows the history, theories and theorists of visual communication.	X					
4	Knows advanced practical skills in various commercial and creative contexts, including graphic and audiovisual multimedia design.	X					
5	Knows national and international ethical rules, standards and legal documents on communication and visual communication design.	X					
6	Able to use the tools, methods and techniques and computer software required for visual communication design applications.				X		
7	Able to produce innovative and original works that reflect abstract and concrete concepts by emphasizing creativity					X	

8	Has the knowledge and skills to transform creative and innovative ideas into graphic, photographic, typographic, illustrative, 2 and 3-dimensional, animated and interactive visual expressions.					X
9	Applies visual communication design techniques with design technologies in developing and changing media environments.		X			
10	Has the competence to create visuals with designs that emphasize aesthetics in design processes.			X		
11	Has the competence to define the problem, solve the problem, plan, manage the project and present in the design-based project development process.					X
12	Has the ability to use research methods and techniques in the field of Visual Communication.	X				
13	Has the competence to research, plan, implement and report during the project phase.			X		
14	Has the competence to establish the connection between design and aesthetic values.			X		
15	Has the competence to interpret universal visual culture and associate the ties of symbols with universal visual culture.			X		
16	Has the competence to analyze, understand and interpret projects in the field of visual communication design with a critical and independent approach.	X				
17	Knows how to integrate and use digital technologies and artificial intelligence based/supported design tools creatively and innovatively in visual communication design and production stages.	X				
18	Knows how to integrate and use digital technologies and artificial intelligence-based/ supported design tools creatively and innovatively in visual communication design and production stages.	X				
19	Evaluates artificial intelligence applications in design studies with a critical approach in terms of aesthetics and originality, and uses them in accordance with ethical rules.	X				

ECTS / STUDENT WORKLOAD				
ACTIVITIES	**NUMBER**	**UNIT**	**HOUR**	**TOTAL (WORKLOAD)**
Course Teaching Hour (X weeks * total course hours)	15		4	60
Preliminary Preparation and self- study	15		2	30
Mid-Term	1		15	15
Quiz				
Assignment				
Project				

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Field Study				
Presentation / Seminar				
Studio Practice				
Final Examination/ Final Project/ Dissertation	1		30	30
Other				
TOTAL WORKLOAD				135
TOTAL WORKLOAD / 25				5,4
ECTS				5

	SDG 1: No Poverty	
	SDG 2: Zero Hunger	
	SDG 3: Good Health and Well-Being	
	SDG 4: Quality Education	
	SDG 5: Gender Equality	x
	SDG 6: Clean Water and Sanitation	
	SDG 7: Affordable and Clean Energy	
	SDG 8: Decent Work and Economic Growth	
	SDG 9: Industry, Innovation and Infrastructure	
	SDG 10: Reduced Inequalities	
	SDG 11: Sustainable Cities and Communities	
	SDG 12: Responsible Consumption and Production	
	SDG 13: Climate Action	
	SDG 14: Life Below Water	
	SDG 15: Life on Land	

	SDG 16:Peace, Justice and Strong Institutions	
	SDG 17:Partnership for the Goals	

ETHICAL RULES WITH REGARD TO THE COURSE
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ASSESSMENT DETAILS AND EVALUATION CRITERIA:
Final Grades will be determined according to the Course Learning Activities and Final Examination/ Project/ Dissertation Assessment Details as below, and comply with the Education and Examination Regulation set forth by the University. Throughout the course, students will learn the theoretical base of the topic and they will be able to equip themselves with the practical know-how skills of Advertisement production. Also, students are expected to design a creative advertisement piece with the knowledge they have gained in the course. During the class sessions, participation is a very important input for the learning process for the students. It is also vital to understand the effect of creativity input on the production process of advertisement. 70% attendance to courses is compulsory. Health reports belong to 30% absenteeism right.

PREPARED BY	Dr. Rihards Vitols
UPDATED	29.09.2025
APPROVED	Asst. Prof. Dr. Hakan Karahasan