Sütun1	ADI-SOYADI	PROJE KONU BAŞLIĞI	KONTENJAN 1. ÖĞRETİM	KONTENJAN 2. ÖĞRETİM	5. sütun
1	PROF.DR. SADETTİN KAPUCU	Design and Development of a Pendulum-Based Experimental System for Determining Mass Moment of Inertia Project Background The mass moment of inertia is one of the most important dynamic properties of mechanical systems. While theoretical methods can accurately determine the mass moment of inertia of geometrically simple components, many practical engineering systems consist of multiple components whose overall inertia is more conveniently determined experimentally. This project aims to design and manufacture a laboratory apparatus capable of experimentally determining the mass moment of inertia of a physical pendulum. The developed system will measure the pendulum motion, calculate its oscillation period, and determine the mass moment of inertia using the governing equations of motion. The experimental results will then be compared with theoretical calculations obtained from analytical equations and CAD software. Project Objectives The student shall design and build a complete experimental setup capable of •□ supporting a physical pendulum with minimum friction, •□ measuring the angular displacement of the pendulum, •□ transferring measurement data to a computer, •□ displaying and recording the oscillation response, •□ determining the oscillation period, •□ calculating the mass moment of inertia, •□ comparing experimental and theoretical results. Scope of the Project 1. Mechanical Design 2. Measurement System 3. Data Acquisition System 4. Software Development 5. Experimental Validation	2	0	

2	PROF.DR. SADETTİN KAPUCU	Ball-on-Table Stabilization Using Classical Control Strategies 1. Introduction The ball-on-table system is a well-known benchmark in control engineering. It consists of a flat plate that can be tilted in two orthogonal axes using servo motors, and a ball that rolls freely on the plate. The goal is to keep the ball at a desired reference position by adjusting the tilt angles. This system is inherently nonlinear, coupled, and underactuated (only 2 actuators for 4 degrees of freedom – ball x, ball y, and two table angles). It is an excellent platform to apply and compare different classical control strategies such as PID, LQR, and feedforward compensation. In this project, students will: •□ Derive the mathematical model of the system. •□ Design and tune multiple classical controllers. •□ Simulate the system in MATLAB/Simulink. •□ Implement and test the controllers on a real experimental setup. 2. Project Objectives •□ Model the ball-on-table system including kinematics, dynamics, friction, and actuator limits. •□ Design a PID controller with anti-windup for ball position regulation. •□ Design a Linear Quadratic Regulator (LQR) based on the linearized system model. •□ Add a feedforward term to improve tracking performance. •□ Compare all controllers in simulation and on hardware. •□ Evaluate robustness under disturbances (external pushes, different ball masses).	0	2	
3	PROF.DR. M. SAİT SÖYLEMEZ	Solar drying via Fresnel Lens	0	1	
4	PROF.DR. M. SAİT SÖYLEMEZ	Solar electricity production by Fresnel Lens	1	0	
5	PROF.DR. ÖMER EYERCİOĞLU	Improvements in the mechanical properties of 3D printed parts	1	0	
6	PROF.DR. ÖMER EYERCİOĞLU	Surface Enhancement by using Abrasive flow machining-Experimental Study	1	0	
7	PROF.DR. ÖMER EYERCİOĞLU	Rapid Tool Manufacturing by Using 3D Printing	0	1	
8	PROF.DR. EMRAH ÖZAHİ	1) Increasing Energy Efficiency through Waste Heat Recovery •□ Identification of waste heat in an industrial system •□ Heat exchanger design •□ Energy and exergy analyses •□ Economic evaluation	1	1	

9	PROF.DR. EMRAH ÖZAHİ	2) Thermal Performance of a Solar Water Heater •□ Building or simulating a solar water-heating system •□ Study on efficiency versus flow rate, solar radiation, and inlet temperature. •□ Experimental testing + MATLAB/ANSYS simulation	1	1	
10	PROF.DR. EMRAH ÖZAHİ	3) Heat Recovery from Exhaust Gases •□ Design of a heat exchanger that recovers waste heat from an engine or industrial exhaust •□ Analysis of energy and exergy efficiencies, pressure drop, and heat-transfer rate •□ Combination of thermodynamics and fluid mechanics	1	1	
11	PROF.DR. EMRAH ÖZAHİ	4) Performance Analysis of a Refrigeration System •□ Experimentally investigation of a vapor-compression refrigeration cycle •□ Calculation of COP, compressor work, cooling capacity, and energy efficiency •□ Study the effect of condenser/evaporator temperatures	1	1	
12	PROF.DR. EMRAH ÖZAHİ	5) CFD Analysis of Flow Through a Pipe Network •□ Investigation of pressure losses in different pipe configurations •□ Comparison of theoretical equations such as Darcy–Weisbach with CFD/experimental results	1	1	
13	PROF.DR. EMRAH ÖZAHİ	6) Flow Around an Airfoil •□ Study on lift, drag, pressure distribution, and flow separation •□ Comparison of several airfoil geometries or angles of attack •□ CFD study using ANSYS Fluent/OpenFOAM	1	1	
14	PROF.DR. EMRAH ÖZAHİ	7) Optimization of a Centrifugal Pump •□ Investigation of impeller geometry, flow rate, pressure rise, and efficiency •□ CFD study to optimize an impeller	1	1	

15	PROF.DR. EMRAH ÖZAHİ	8) Wind Turbine Blade Optimization •□ Analysis of airflow around different blade profiles •□ Optimization of blade geometry for maximum aerodynamic efficiency •□ Combination of fluid mechanics, CFD, and renewable energy	1	1	
16	DOÇ.DR. ALİ KILIÇ	Soft Wall-Climbing Robot Design and Prototyping Proje Tanımı: In this project, you are expected to design and prototype a soft robot capable of climbing vertical surfaces. The robot should use flexible materials and a suitable adhesion mechanism, such as suction cups, vacuum adhesion, gecko-inspired dry adhesives, or electroadhesion, to attach to and move across different wall surfaces.	1	1	
17	DR. ÖĞR. ÜYESİ M. ERKAN KÜTÜK	1.) Motion Control and Experimental Applications of a 4-DOF Robot	1	1	
18	DR. ÖĞR. ÜYESİ M. ERKAN KÜTÜK	2.) Control and Experimental Applications of a 2-DOF Helicopter System	1	1	
19	PROF.DR. Ö. YAVUZ BOZKURT	Development of Hybrid Cast Composites Reinforced with Additively Manufactured Lattice Structures	1	1	
20	PROF.DR. Ö. YAVUZ BOZKURT	Development of a Multi-Layer Composite Impact Liner Using Silicone Molding	1	1	
21	PROF.DR. Ö. YAVUZ BOZKURT	Design and Manufacturing of a Textile-Reinforced Composite Bellows	1	1	
22	DR. ÖĞR. ÜYESİ MAHMUT FURKAN KALKAN	Composite Materials	1	1	
23	DR. ÖĞR. ÜYESİ MAHMUT FURKAN KALKAN	Surface Treatment and Corrosion	1	1	
24	DR. ÖĞR. ÜYESİ MAHMUT FURKAN KALKAN	Characterization techniques on materials	1	1	
25	PROF.DR. NECİP FAZIL YILMAZ	Additive Manufacturing	1	1	
26	DOÇ.DR. HÜSEYİN YAĞLI	Off-grid smart green city design considering energy, building and food sustainability	1	1	
27	DR.ÖĞR. ÜYESİ SADIK OLGUNER	Experimental investigation on the mechanical properties of hybrid nonwoven fabric/glass fiber reinforced composites	1	1	

28	DR.ÖĞR. ÜYESİ SADIK OLGUNER	Defect detection and quality control in sheet metal parts with image processing	1	1	
29	DOÇ.DR. N. FURKAN DOĞAN	Design and Production of Oblique Low-Velocity Impact Fixture	3	1	