2024-2025 Bahar Dönemi ME 499

Sıra No	Akademisyen	Proje Adı	Kontenjan-1. öğr.	Kontenjan-2. öğr.
1	PROF.DR. M. YAŞAR GÜNDOĞDU	Biofluid Aplication For Mechanics; AO VALFE DESIGN	1	1
2	PROF.DR. M. YAŞAR GÜNDOĞDU	Central Nervous System for human brain.	1	1
3	PROF.DR. M. SAİT SÖYLEMEZ	Determination of Energy Audit for a Specific Textile Factory	1	1
4	PROF.DR. M. SAİT SÖYLEMEZ	Energy Research on a Typical Iron Casting Plant	1	1
5	DOÇ.DR. HÜSEYİN YAĞLI	Off-grid smart green city design considering energy, building and food sustainability	1	1
6	PROF.DR. EMRAH ÖZAHİ	A Thermodynamic Analysis of an Actual Power Plant	2	2
7	PROF.DR. NİHAT YILDIRIM PROF.DR. A. İHSAN KUTLAR	Design and 3-D prototyping of an automated eye drop kit for kids & elderlies	1	1
8	PROF.DR. NİHAT YILDIRIM PROF.DR. A. İHSAN KUTLAR	Design and 3-D prototyping of an ergonomic orthopedic back support for injured elderlies	1	1
9	PROF.DR. NECİP FAZIL YILMAZ	Eklemeli imalat çalışmaları Makine öğrenmesi ve yapay zeka Metalik malzeme karakterizasyonu	5	5
10	PROF.DR. SADETTİN KAPUCU	1. Modeling and Control of a Delta Robot (2 students) Delta robots are parallel kinematic machines known for their high speed and accuracy. This project involves modeling the kinematics and dynamics of a delta robot and designing a control system to achieve precise motion. Tasks::Kinematic Modeling: • Develop forward and inverse kinematics models to relate the joint angles to the end-effector position and orientation. • Consider the geometric constraints of the delta robot's parallel structure. Dynamic Modeling: • Derive the equations of motion for the delta robot, accounting for the masses, inertias, and joint torques. • Consider the effects of friction, gravity, and other external disturbances. Control System Design: • Implement a suitable control strategy (e.g., PID, feedforward-feedback, or model predictive control) to regulate the joint angles and achieve desired end-effector trajectories. • Tune the control parameters to optimize performance and robustness. Simulation and Experimental Validation: • Simulate the delta robot's behavior using a modeling and simulation tool (e.g., MATLAB, Simulink). • Conduct experiments on a real delta robot to validate the model and control system. By completing this project, students will gain valuable experience in robotics modeling, control system design, and experimental validation. They will also develop a strong foundation for further research and applications in robotics.	1	1

11	PROF.DR. SADETTİN KAPUCU	2. Modeling and Control of a 4-DOF Serial Robot (2 students) Serial robots are common in industrial automation and robotics research. This project focuses on modeling and controlling a 4-DOF serial robot, which offers flexibility in terms of workspace and tasks. Tasks: Kinematic Modeling: • Develop forward and inverse kinematics models to relate the joint angles to the end-effector position and orientation. • Consider the Denavit-Hartenberg (DH) parameters for representing the robot's geometry. Dynamic Modeling: • Derive the equations of motion for the serial robot, accounting for the masses, inertias, and joint torques. • Consider the effects of gravity, friction, and payload variations. Control System Design: • Implement a suitable control strategy (e.g., PID, joint-space control, or task-space control) to regulate the joint angles and achieve desired end-effector trajectories. • Tune the control parameters to optimize performance and robustness. Simulation and Experimental Validation: • Simulate the serial robot's behavior using a modeling and simulation tool. • Conduct experiments on a real 4-DOF serial robot to validate the model and control system. By completing this project, students will gain valuable experience in robotics modeling, control system design, and experimental validation. They will also develop a strong foundation for further research and applications in robotics.	1	1
12	DOÇ.DR. FUAT YILMAZ	Low Temperature Stirling Engine Manufacturing "Low temperature Stirling engines are a fascinating technology that can harness even small temperature differences to produce mechanical work. These engines are particularly attractive due to their potential to utilize waste heat from various sources, such as industrial processes, solar collectors, or even the human body. While the concept is promising, manufacturing low temperature Stirling engines presents several challenges: Precision engineering: These engines require tight tolerances and precise component manufacturing to ensure efficient operation. Material selection: Suitable materials must be chosen to withstand the temperature differences and pressures involved. Heat transfer optimization: Maximizing heat transfer between the heat source and the working fluid is crucial for efficient operation. Sealing and lubrication: Ensuring proper sealing and lubrication in the presence of temperature fluctuations can be challenging. Cost-effectiveness: Achieving competitive costs while maintaining high performance is essential for widespread adoption."	1	1

13	DOÇ.DR. FUAT YILMAZ	Gamma Type Stirling Engine Manufacturing The Gamma-type Stirling engine has two cylinders: a power cylinder and a displacer cylinder. The displacer moves the working gas between the hot and cold regions, while the power piston performs the work. Both are connected to a crank mechanism, with a phase difference of typically 90°. Precision engineering: These engines require tight tolerances and precise component manufacturing to ensure efficient operation. Material selection: Suitable materials must be chosen to withstand the temperature differences and pressures involved. Heat transfer optimization: Maximizing heat transfer between the heat source and the working fluid is crucial for efficient operation. Sealing and lubrication: Ensuring proper sealing and lubrication in the presence of temperature fluctuations can be challenging. Cost-effectiveness: Achieving competitive costs while maintaining high performance is essential for widespread adoption.	1	1
14	DOÇ.DR. FUAT YILMAZ	Model Size Automatic Solar Tracker Project using ESP32 or Arduino "This project involves building a small-scale solar tracker that automatically adjusts its position to maximize solar panel exposure. It's a great way to learn about electronics, programming, and renewable energy. https://www.youtube.com/results?search_query=Automatic+Solar+Tracker+Arduino"	1	1
15	DOÇ.DR. FUAT YILMAZ	CFD Studies for Heat Transfer Enhancement CFD studies for heat transfer enhancement involve simulating and analyzing fluid flow and thermal interactions within a system to improve its thermal performance. The process begins with defining objectives, such as increasing heat transfer rates, minimizing thermal resistance, or optimizing pressure drop. A detailed geometry of the system, like a heat exchanger or cooling channel, is created, incorporating features such as fins, grooves, or vortex generators for enhancement. Warning:This project is for students who want to improve their scientific and engineering CV. At the end of the project, there is a goal to present an international conference paper. Those who do not have such a goal can examine other projects.	2	2
16	DR.ÖĞR.ÜYESİ ALİ KILIÇ	Design and Simulation of Off-Highway Vehicles Using MATLAB Simscape	1	1
17	DR.ÖĞR.ÜYESİ ALİ KILIÇ	Telehandler Boom Design and Kinematic Analysis Using Matlab Simscape	1	1
18	DR.ÖĞR.ÜYESİ ALİ KILIÇ	Telehandler Hydraulic System Design and Simulation Using Matlab Simscape	1	1
19	DR.ÖĞR.ÜYESİ HAKAN ÇANDAR	Maintenance and Repair of AWJ Intensifier Pumps: A Technical Study	1	1
20	DR.ÖĞR.ÜYESİ HAKAN ÇANDAR	Machine Design	1	1

21	DR. ÖĞR.ÜYESİ N. FURKAN DOĞAN	Laboratuvar Vinci Tasarımı ve Üretimi / Design and Manufacturing of Laboratory Crane This project focuses on the complete design, analysis, and manufacturing of a laboratory crane intended for use in a controlled environment, such as research laboratories or small-scale industrial settings. The crane should have a compact, lightweight, and modular design, capable of lifting and transporting loads within a specific range. The crane should integrate modern engineering principles, including finite element analysis (FEA), material selection, and safety considerations	1	1
22	DR. ÖĞR.ÜYESİ N. FURKAN DOĞAN	Delikli Hibrit Kompozitlerin Mekanik Özelliklerinin Analizi / Analysis of the Mechanical Properties of Open-Hole Hybrid Composites This project focuses on experimentally analyzing the mechanical properties of Open-Hole hybrid composites. Hybrid composites are materials that combine two or more types of reinforcements and/or matrix materials to achieve superior properties. The study will investigate how different hole geometries and layouts affect the mechanical behavior of these materials under tensile, compressive, and shear loads. The aim is to optimize the design of perforated composites for engineering applications.	1	1
23	PROF.DR. ÖMER EYERCİOĞLU	Experimental studies on abrasive flow finishing	1	1
24	PROF.DR. ÖMER EYERCİOĞLU	Modeling of asymmetric gear tooth profile	1	1
25	PROF.DR. ÖMER EYERCİOĞLU	Rapid Tool Manufacturing Using 3D Printing (Additive Manufacturing)	1	1
26	DR.ÖĞR.ÜYESİ SADIK OLGUNER	Experimental investigation on the mechanical properties of thermoplastic matrix composites	1	1
27	DR.ÖĞR.ÜYESİ SADIK OLGUNER	Design and construction of a laboratory crane for tool change in tensile test machine	1	1
28	DR.ÖĞR.ÜYESİ SADIK OLGUNER	Evaluation of various composite materials used in dental treatment by finite element analyses	1	1
29	PROF.DR. Ö. YAVUZ BOZKURT	Mini plastik enjeksiyon makinesi yapımı (Mini plastic injection moulding machine construction)	5	5
30	PROF.DR. Ö. YAVUZ BOZKURT	3B yazıcı yapımı (3D printer construction)	5	5
31	PROF.DR. Ö. YAVUZ BOZKURT	Mekanik testler için bir deney düzeneği yapımı (Construction of an experimental set-up for mechanical tests)	5	5
32	DR.ÖĞR.ÜYESİ M. ERKAN KÜTÜK	Solving Dynamics Problems by Geogebra	1	1
33	DR.ÖĞR.ÜYESİ M. ERKAN KÜTÜK	Modeling and Control of a Stewart Platform	1	1
34	DR.ÖĞR.ÜYESİ M. ERKAN KÜTÜK	Modeling and Control of a Ball Balancing Table	1	1
35	PROF.DR. A. TOLGA BOZDANA	Advanced High Strength Steels: Classification, Production, Applications	1	1
36	DOÇ.DR. ABDULLAH AKPOLAT	Design and production of a gearbox by additive manufacturing process	1	1
37	PROF.DR. AHMET ERKLİĞ	Production and Bending Performance of Hat-Stiffened Composite Structures	2	2
38	PROF.DR. AHMET ERKLİĞ	Artificial Intelligence Assisted Analysis and Optimization of Flexural Performance of Hat-Stiffened Composite Structures	2	2
39	PROF.DR. AHMET ERKLİĞ	Artificial Intelligence Assisted Prediction of Mechanical Performance of Polymer Composite Materials	2	2