		ECT410 & MENG410 CAPSTONE TEAM PROJECT GROUPS	<u> </u>
ir. N	Supervisor	Project Title	Pre-Requisites
		Solar Powered Stirling Engine: This project aims to design and fabricate Stirling engine using solar energy as a heating source. The objective is to implement the utilization of renewable energy to provide the heating source for the engine by designing a	
1	Assoc. Prof. Dr. Murat Özdenefe	concentrated solar collector to produce a very high temperature similar to that of a small gas burner. Furthermore, this project will	MECT361, MECT444, EENG410, MENG442. Two studer must be from Mechatronics Program.
	Murat Ozachere	demonstrate the Stirling engine capacity to produce power that is eco friendly and very practical for many applications.	mast be from meendromes rogram.
		Smart Window Shade: The objective of this project is: To design and manufacture an external shading element for windows	
	Assoc. Prof. Dr.	that is movable and preferably modular. The objective of the system is to block the direct radiation incident on the window for	MECT361, MECT444, EENG410, MENG442. Two studer
2	Murat Özdenefe	mimimising the heat gains during cooling season and to allow it to fall on the window for maximizing the heat gains during heating season. The external shading element will continiously adjust itself accordingly relative to the sun during a day by means of motors.	must be from Mechatronics Program.
		The system will also be designed to adjust itself seasonally.	
		Indirect Evaporative Cooling assisted vapor compression cooler: Students are expected to design, develop	MENG244 OR MENG246, MENG303
	Assoc. Prof.	and test a sustainable cooling system by integration of an existing evaporative coolings system with vapor compression unit. Within the project design, development and testing of the cooling system will be performed.	
3	Dr. Devrim Aydin	the project design, development and testing of the cooling system will be performed.	
		Solar vegetable dryer: Students are expected to develop a drying system driven by solar collectors and heat recovery system to dry different types of vegetables. Within the project design, development and testing of the solar dryer will	MENG244 OR MENG246, MENG303
4	Assoc. Prof. Dr. Devrim Aydin	be performed.	
		Solar driven thermal energy storage: Students are expected to develop an air cycle for storing thermal energy. System	MENG244 OR MENG246, MENG303
5	Assoc. Prof.	will be integrated with heat recovery for improved efficiency. Within the project design, development and testing of thethermal energy storage system will be performed.	
_	Dr. Devrim Aydin		
			ANTINOSA OR ANTINOSAS ANTINOSAS
		Direct evaporative cooler using natural local materials: Students are expected to design, develop and test a direct evaporative cooling system using locally sourced natural materials as the evaporative cooling pad. Within the project	MENG244 OR MENG246, MENG303
6	Assoc. Prof. Dr. Devrim Avdin	design, development and testing of the cooling system will be performed.	
		Solar Air Conditioner — It is required to convert an old airconditioner into a solar PV-operated air conditioner	
_	Prof. Dr.	that will run from a battery directly. The battery will store the energy from the solar panels and will be able to run the	ANTHORAG ANTOTAGA ANTOGAGA CONTRACTOR
7	Uğur Atikol	air conditioner for 3 to 4 hours until it is charged again. It is required to have a multi-disciplinary team with a partner from the EE department.	MENG345, MECT361, MENG364, EENG350, MENG443
		Wind Energy Storage System — It is required to design an energy storage system for a wind turbine having the capacity for storing energy that can provide electricity to the internet, ty, a few bulbs and charging for the cell phone	
8	Prof. Dr.	capacity for storing energy that can provide electricity to the internet, tv, a few bulbs and charging for the cell phone for at least 2 hours. The team should be a multi-disciplinary team formed by mechatronics and electrical engineers.	MECT361, EENG350, MENG364, EENG342
	Uğur Atikol		
	Prof. Dr.	Drag Measuring System: A drag for measuring device will be designed and manufactured for	
9	Hasan Hacisevki	wind tunnel test equipment. The device will measure the drag force during wind tunnel test	MENG201, MENG203, MENG375
		and display the result on a digital display.	
		3 D carving machine: A 3 D three axis wood carving machine will be designed and	
10	Prof. Dr.	maufactured. The plane dimensions will be 40 cm by 40 cm and height 30 cm. The system will be controlled through a open source software and must allow to upload drawings from	MENG286, MENG303, MENG375, MECT444
	Hasan Hacisevki	Solidwork software.	1
		An automotive electric system work bench will be designed and manufactured for Automotive	
	Prof. Dr.	Systems course (MENG423) labortory studies. Students will design the electric systems (
11	Prot. Dr. Hasan Hacisevki	wiring harness) and manufacture the test equipment.	MENG423, EENG225
		Pneumatic paper shear machine: A pneumatically controlled paper shearing machine will be	
12	Prof. Dr.	designed and manufactured. The plate dimension will allow A4 size paper up to 100 mm stroke	MENG201, MENG353, MENG375, MENG376
	Hasan Hacisevki	distance. Must include all safety functions and accesssories.	,,,
		Davalonment and implementation of colid state batteries	MENG303, MENG331, MENG364, MENG375, MECT375, MECT3
	Accor Book D	Development and implementation of solid-state batteries Solid-state batteries replace the liquid or gel electrolytes found in traditional lithium-ion batteries with a solid	MECT444
13	Assoc. Prof. Dr. Babak Safaei	electrolyte, which is safer, more stable, and potentially offers higher energy density. Solid-state batteries have the potential to offer faster charging times, longer lifetimes, and increased safety, making them attractive for use in	SPECIAL REQUIREMENT: At least 2 team members should be from the Mechatronics Program.
		potential to offer faster charging times, longer lifetimes, and increased safety, making them attractive for use in electric vehicles, consumer electronics, and grid-scale energy storage.	Software: Solidworks, ANSYS, Abaqus
		Multi-functional sandwich structures	MENG303, MENG331, MENG364, MENG375, MECT375, MECT3 MECT444
14	Assoc. Prof. Dr.	The development of multi-functional sandwich structures that can perform multiple functions, such as providing structural support, thermal insulation, and acoustic absorption, is another current hot topic in the field. Research is	SPECIAL REQUIREMENT: At least 2 team members should be fro
	Babak Safaei	being conducted to develop new core materials and face sheet materials that can provide multiple functions and to	the Mechatronics Program. Software: Solidworks, ANSYS, Abaqus
		optimize the design of sandwich structures for multi-functionality.	MENG303, MENG331, MENG364, MENG375, MECT375, MECT3
		Development of Lattice Models	MECT444
15	Assoc. Prof. Dr. Babak Safaei		SPECIAL REQUIREMENT: At least 2 team members should be fro the Mechatronics Program.
			Software: Solidworks, ANSYS, Abaqus
		Adaptive Manufacturing of Auxetic Structures	MENG303, MENG331, MENG364, MENG375, MECT375, MECT3
10	Assoc. Prof. Dr.		MECT444 SPECIAL REQUIREMENT: At least 2 team members should be fr
16	Babak Safaei		the Mechatronics Program. Software: Solidworks, ANSYS, Abaqus
			MENG303, MENG331, MENG364, MENG375, MECT361, MECT444, EENG320, EENG410, EENG428
17	Prof. Dr. Qasim Zeeshan	Refurbishment of the Mini CNC Milling Machine	SPECIAL REQUIREMENT: At least 2 team members should be fro the Mechatronics Program.
			Software: Solidworks, MATLAB, Simulink, ANSYS, ARDUINO, PL ROS
			MENG303, MENG331, MENG364, MENG375, MECT361,
	Prof. Dr.		MECT444, EENG320, EENG410, EENG428 SPECIAL REQUIREMENT: At least 2 team members should be fr
18	Qasim Zeeshan	Refurbishment of the Mini CNC Turning Machine	the Mechatronics Program. Software: Solidworks, MATLAB, Simulink, ANSYS, ARDUINO, PL
			ROS
		Snake Robot - 2.0: This project focuses on the redesign, development and testing of the snake robot 1.0 which was inspired from real snakes. It consists of compact links (brackets) which allows to maintain smooth movements. The most effective movement pattern such as; crawling and slithering	MENG303, MENG331, MENG364, MENG375, MENG353, MECT361, MECT444, EENG320, EENG410, EENG428
19	Prof. Dr.	consists of compact links (prackets) which allows to maintain smooth movements, line most effective movement pattern such as; crawing and semening must be implemented. Servio motors, wireless cam, Arduino Nano and remote control are some of the components that must be used to develop this prototype. To make the snake robot function like a real snake, it is constructed using many brackets. To cut down the cost, these brackets must be designed.	SPECIAL REQUIREMENT: At least 2 team members should be fro the Mechatronics Program.
	Qasim Zeeshan	and 3D printed. Each bracket can have a servo motor that enables the robot to have various degrees of freedom for different gaits. Modular design must	the Mechatronics Program. Software: Solidworks, MATLAB, Simulink, ANSYS, ARDUINO, RC
		give the robot flexibility to reach different territories and ability to move around in complex environments. The work will cover several key areas of	İ
		mechanical and mechatronics engineering.	
		Digitization of Universal Vibration Apparatus – TM16 - TM16 series is a range of products that teach different	MENG303, MENG331, MENG364, MENG375, MECT361, MECT444, EENG320, EENG410, EENG428
20	Prof. Dr.	Digitization of Universal Vibration Apparatus – TM16 - TM16 series is a range of products that teach different aspects of vibrations and oscillations in mechanical systems. These include pendulums, mass-springs systems and shafts and beams. The TM16 series is a modular system, based around a Faren and Cupboard. The aim of the project is to digitize the apparatus by	MECT444, EENG320, EENG410, EENG428 SPECIAL REQUIREMENT: At least 2 team members should be fro
20		Digitization of Universal Vibration Apparatus — TM16 - TM16 series is a range of products that teach different aspects of vibrations and oscillations in mechanical systems. These include pendulums, mass-springs systems and shafts and beams.	MECT444, EENG320, EENG410, EENG428 SPECIAL REQUIREMENT: At least 2 team members should be fr the Mechatronics Program.
20	Prof. Dr.	Digitization of Universal Vibration Apparatus — TM16 - TM16 series is a range of products that teach different sepects of vibrations and oscillations is mechanical systems. These include pendulums, mass-springs systems and shifts and beams. The TM16 series is a modular system, based around a Farme and Cupboard. The aim of the project is to digitize the apparatus by integrating it with digital sensors and a digital display until with data transmission to a PC. The work will cover several key areas of	MECT444, EENG320, EENG410, EENG428 SPECIAL REQUIREMENT: At least 2 team members should be fr the Mechatronics Program.
20	Prof. Dr.	Digitization of Universal Vibration Apparatus — TM16 - TM16 series is a range of products that teach different aspects of Winations and occiliations in mechanical systems. These include pendulums, mass-prings systems and shafts and beams. The TM15 series is a modular system. Such advanced a Frame and Cuphosal. The end of the project to delight the apparatus by integrating it with degital series and a degital display unit with data transmission to a PC. The work will cover several key areas of mechanical and mechaniconic segmenting. Design and Development of Micro Vertical Axis Wind Turbine (VAWT)- The objective of this project is	MECT444, EENG320, EENG410, EENG428 SPECIAL REQUIREMENT: At least 2 team members should be fr the Mechatronics Program.
	Prof. Dr.	Digitization of Universal Vibration Apparatus – TM16 - TM16 series is a range of products that teach different aspects of vibrations and oscillations in mechanical systems. These include pendulums, mass-springs systems and shafts and beams. The TM16 series is a modulur system. Board abordant Faren and Cupbated. The aim of the project is obligative the apparatus by integrating a with digital sensors and a digital display unit with data transmission to a PC. The work will cover several key areas of mechanical and mechanical series and exhances engineering. Design and Development of Micro Vertical Axis Wind Turbine (VAWT)- The objective of this project is to design and develop a Bio-impried Wind Turbine. The sub systems: croot blades, transmission (gear bod.), braking and control systems, invertee and storage system Biotechy must be configured to achieve the performance requirements. The data equisition	MECTA14, ERNG320, ERNG410, ERNG428 SPECIAL REQUISEMENT. At least 2 team members should be fir the Mechatronics Program. Software: Solidworks, MATLAB, Simulinik, ANSYS, ARDUNO, PLUMON, MECTA16, MECTA16, MECTA16, MECTA16, MECTA16, MECTA16, MECTA16, ERNG320, MENG331, MENG364, MENG375, MECT361, MECTA16, ERNG320, ERNG410, ERNG428 SPECIAL REQUISEMENT. At least 2 team members should be fire
	Prof. Dr. Qasim Zeeshan	Digitization of Universal Vibration Apparatus — TM16 - TM16 series is a range of products that teach different aspects of vibrations and oscillations in mechanical systems. These include pendulums, mass-springs systems and shafts and beams. The TM16 series is a modular system. Based around a Frame and Cupboard. The aim of the project is obligative the apparatus by integrating it with digital semsors and a digital display unit with data transmission to a PC. The work will cover several key areas of mechanical and mechatronics engineering. Design and Development of Micro Vertical Axis Wind Turbine (VAWT)- The objective of this project is to design and develop a Bio-inspired Wind Turbine. The sub systems: rotor blades, transmission (gear box), braking and control system, inverter and storage system (but the project is be configured to achieve the performance requirements. The data equisition system must be an integral part of the design. The static & synthm bushbarcing is mandatory. The work locor several key areas of	MECTA44, EPNG320, EEMG310, EENG428 SFCHAI, REQUIREMENT: At least 2 team members should be fr the Mechatronics Program. Software: Solidworks, MATLAB, Simulink, ANSYS, ARDUINO, PL MENG303, MENG331, MENG364, MENG375, MECT361, MENG303, MENG331, MENG364, MENG375, MECT361,
	Prof. Dr. Qasim Zeeshan Prof. Dr.	Digitization of Universal Vibration Apparatus – TM16 - TM16 series is a range of products that teach different aspects of vibrations and oscillations in mechanical systems. These include pendulums, mass-springs systems and shafts and beams. The TM16 series is a modulur system. Board abordant Faren and Cupbated. The aim of the project is obligative the apparatus by integrating a with digital sensors and a digital display unit with data transmission to a PC. The work will cover several key areas of mechanical and mechanical series and exhances engineering. Design and Development of Micro Vertical Axis Wind Turbine (VAWT)- The objective of this project is to design and develop a Bio-impried Wind Turbine. The sub systems: croot blades, transmission (gear bod.), braking and control systems, invertee and storage system Biotechy must be configured to achieve the performance requirements. The data equisition	MICCT444, ERNCIZO, ERNCIAID ERNCIAID SEVENA ERNOLIDA EN ESTECIAI REQUIRENTA. IL essal 2 team members should be fr the Mechatronics Program. Software: Software Softwa
	Prof. Dr. Qasim Zeeshan Prof. Dr.	Digitization of Universal Vibration Apparatus — TM16 - TM16 series is a range of products that teach different aspects of vibrations and oscillations in mechanical systems. These include pendulums, mass-springs systems and shafts and beams. The TM16 series is a modular system. Baded around a Frame and Cupboard. The aim of the project is obligative the apparatus by integrating a with digital semsors and a digital display unit with data transmission to a PC. The work will cover several key areas of mechanical and mechatronics engineering. Design and Development of Micro Vertical Axis Wind Turbine (VAWT)- The objective of this project is to design and develop a Bio-inspired Wind Turbine. The sub systems: rotor blades, transmission (gear bod, braking and control systems, inverter and storage system (battery) must be configured to achieve the performance requirements. The data acquisition system must be an integral part of the design. The static & dynamic balancing is mandatory. The work will cover several key areas of mechanical and mechatronics engineering. Refurbishment of a Mini Cricular Automated Storage and Retrieval System (ASRS)- Automated	MICCTA44, ENOSZO, EENGGLID, EENGGLIS SPECIAR EQUIRIBATION: At least 2 team members should be fin the Mechatronics Program. Software: Solidworfs, MATTAB, Simulinis, ANSYS, ARDUINO, PLI MICCTA44, EROSA, MENGSSI, MENGSSI, MENGSSI, MECTSSI, MECTA44, EROSA, ERNGSII, MENGSSI, MECTSSI, MECTA44, EROSA, ERNGSII, ERNGSII, MECTA44, EROSA, ERNGSII, SPECIAR REQUIREMENT: At least 2 team members should be fin the Mechatronics program. Software: Solidworfs, MATTAB, Smulinis, ANSYS, ARDUINO, PLC
21	Prof. Dr. Qasim Zeeshan Prof. Dr.	Digitization of Universal Vibration Apparatus — TM16 - TM16 series is a range of products that teach different aspects of vibrations and oscillations in mechanical systems. These include pendulums, mass-springs systems and shafts and beams. The TM16 series is a modular system. Baded around a Frame and Cupboand. The aim of the project is to digite the apparatus by integrating a with digital semsors and a digital display unit with data transmission to a PC. The work will cover several key areas of mechanical and mechatronics engineering. Design and Development of Micro Vertical Axis Wind Turbine (VAWT)- The objective of this project is to design and develop a Bio-inspired Wind Turbine. The sub systems: rotor blades, transmission (gear bod, braking and control system, inverter and storage system (battery) must be configured to achieve the performance requirements. The data acquisition system must be an integral part of the design. The static & dynamic balancing is mandatory. The work will cover several key areas of mechanical and mechatronics engineering. Refurbishment of a Mini Cricular Automated Storage and Retrieval System (ASRS) - Automated Storage and Retrieval Systems (ASRS) - Automated Storage and Retrieval Inamilies in advanced manufactubit the systems and are brought visited in distribution centers as subsystem for production area. The aim of the project is to refurbish them.	MECTA44, ENOSZO, EENGG10, EENGG28 SPECIAR EQUIRMENT: At least 2 team members should be fin the Mechatronics Program. Software: Solidworfs, MATTAB, Simulinik, ANSYS, ARDUINO, PLI MENGSIO3, MENGSISI, MENGSIS, MENGSIS, MECTASI, MECTA44, EENGSIO2, EENGG10, EENGG25 SPECIAR EQUIREMENT: At least 2 team members should be fin Mechatronics Program. Software: Solidworfs, MATTAB, Simulinik, ANSYS, ARDUINO, PLC MENGSIO3, MENGSISI, MENGSISI, MENGSISI, MECTSISI, MECTA44, ERNGSIO2, EENGG25 SPECIAR EQUIREMENT: At least 2 team members should be fin MECTA44, ERNGSIO2, EENGG25 SPECIAR EQUIREMENT: At least 2 team members should be fin
21 22	Prof. Dr. Qasim Zeeshan Prof. Dr. Qasim Zeeshan	Digitization of Universal Vibration Apparatus — TM16 - TM16 series is a range of products that teach different aspects of vibrations and oscillations in mechanical systems. These include pendulums, mass-springs systems and shafts and beams. The TM15 series is a modular system. Based abroads a Frame and Lipsbaard. The aim of the project is obligative the apparatus by integrating it with digital sensors and a digital display unit with data transmission to a PC. The work will cover several key areas of mechanical and mechanicals and mechanical and mechanical and mechanical and mechanical and mechanicals and mechanical	MICCTASS, ERNGSID, ERNGSID, ERNGSID, SENGER SPECIAR REQUIREMENT. At least 2 team members should be fit the Mechatronics Program. Software: Softwares, AMTIAB, Simulink, ANSYS, ARDUINO, Pt. MENGSID, MENGSIS, MENGSIS, MENGSIS, MECTISSI, MECTISSI, MECTISSI, MECTISSI, MENGSIS, MENGSIS, MENGSIS, MENGSIS, MECTISSI, MECTISSI, MENGSIS, MENGSIS, MECTISSI, MECTISSI, MENGSIS, MENGS