

ME 495 - 242 Proposals

Ser. #	Advisor Name	email	Research Title	Research Description	Area of research
1	Dr. Mohamed Abdelkarim Antar	antar@kfupm.edu.sa	Brine concentration using HDH desalination technology – a practical approach	Humidification Dehumidification desalination has found success in used water treatment, especially with high salinity brine where other methods can not handle. An experimental setup exists in the Desalination lab. The plan is to complete and test the setup that has bubble column humidifier and a bubble column dehumidifier. Closed loop water system is used to concentrate the brine while an open air loop is considered. Objectives is to complete the setup and run experiments to check the highest concentration reached.	Desalination
2	Dr. Belal Almomani	belal.momani@kfupm.edu.sa	Develop a finite element model for investigating the influence of pellet-cladding bonding area on the structural response of spent nuclear fuel rods	The pellet-clad bonding effect results from nuclear fuel pellet swelling, clad creep-down, and the formation of the high burnup structure at the surface of the fuel pellets. Understanding how the bonding area between the fuel pellets and the cladding in a nuclear fuel rod affects the rod's structural response is important for safe handling. Moreover, evaluating how stresses are distributed throughout the fuel rod as a function of the bonding area can be critical for predicting the potential of failure. The student will have the experience to tackle this problem via utilizing ABAQUS/explicit. More details about the problem's background can be found in the advisor's previous work https://doi.org/10.1016/j.nucengdes.2018.07.024 .	Structural Mechanics
3	Dr. Jafar Albinmoussa	binmoussa@kfupm.edu.sa	Finite Element Simulation of Burst Pressure in Hydrogen Storage Vessel	Hydrogen storage vessels are usually pressurized to nearly 70 MPa. Such pressure generates significant stresses that can reach to a critical values and cause the vessel to burst. Finite element modeling of burst pressure is very important for designing safe vessel.	Damage mechanics, Finite Element Analysis
4	Dr Mohamed Abdrabou Hussein	mahusseini@kfupm.edu.sa	High Entropy Alloy for Biomedical Applications	The student will engage in the experimental work including Material processing, characterizations, and performance evaluation	Materials & Manufacturing
5	Dr Mohamed Abdrabou Hussein	mahusseini@kfupm.edu.sa	Mg Nanocomposite for Hydrogen Storage Applications	The student will participate in the Material processing, and characterizations	Materials & Manufacturing
6	Dr Mohamed Abdrabou Hussein	mahusseini@kfupm.edu.sa	Surface Engineering of Ti for Bio Implant Applications	The work includes coating/surface treatment of Ti alloy and performance evaluation for biomedical application.	Materials & Manufacturing
7	Dr Mohamed Abdrabou Hussein	mahusseini@kfupm.edu.sa	Mg Nanocomposite for Biomedical Applications	The student will participate in the Material processing and performance evaluation. The student will be involved also in the literature review to select the most appropriate reinforcements.	Materials & Manufacturing
8	Dr. Usman Ali	usman.ali@kfupm.edu.sa	3D printing for various applications	Stduent will work on 3d printed parts with metals and polymers	
9	Dr. Aamer Nazir	aamer.nazir@kfupm.edu.sa	Design and 3D printing of Mechanical gears	This research involves Design work using Solidworks and other simple softwares, FEA using ansys, and additive manufacturing using FDM for validation.	Design and Additive Manufacturing
10	Dr. Aamer Nazir	aamer.nazir@kfupm.edu.sa	Design for Additive Manufacturing for Energy Harvesting applications (Continue...)	This research involves Design work using Solidworks and other simple softwares, FEA using ansys, and additive manufacturing using FDM for validation.	Design and Additive Manufacturing
11	S Fida Hassan	sfhassan@kfupm.edu.sa	Development of magnesium alloy/composite for hydrogen storage	Experimental work (continuation of existing project)	Materials and Manufacturing
12	S Fida Hassan	sfhassan@kfupm.edu.sa	Development of magnesium alloy/composite for bio-implant	Experimental work (continuation of existing project)	Materials and Manufacturing
13	S Fida Hassan	sfhassan@kfupm.edu.sa	Design and development of High Entropy Alloy	Experimental work (continuation of existing project)	Materials and Manufacturing
14	S Fida Hassan	sfhassan@kfupm.edu.sa	Design and development of heterogeneous structural composite	Experimental work	Materials and Manufacturing
15	S Fida Hassan	sfhassan@kfupm.edu.sa	Processing of heavy alloy nuclear reactor	Experimental work (continuation of existing project)	Materials and Manufacturing
16	Y Seid Ahmed	yassmin.seidahmed@kdupm.edu.sa	Design and Simulation of Coatings and Laser Textured Surfaces: Interface Failures and Texture Dimension	This research focuses on the design and simulation of coatings and laser-textured surfaces, examining the effects of interface failures and texture dimensions. Using advanced simulations, it investigates how texture dimensions influence coating performance and bond coat durability, with the goal of optimizing material design for enhanced surface functionality and longevity.	Materials and Manufacturing
17	Y Seid Ahmed	yassmin.seidahmed@kdupm.edu.sa	Design, Simulation, and Additive Manufacturing of Polymers for Various Applications	This research focuses on improving the quality and functional properties of 3D-printed polymers. It aims to enhance surface finish, mechanical strength, and durability, making 3D-printed polymers more reliable for various industrial application	
18	Jihad AlQasimi	jeqasimi@kfupm.edu.sa	Design of Nonlinear Springs for Tailoring Wave Propagation	The student will design a nonlinear spring and validate its performance through experiments and FEM analysis.	Structural Mechanics
19	Ihsan ulhaq Toor	ihshan@kfupm.edu.sa	-Hydrogen embrittlement challenges (transportation & storage) -Advanced alloys/high entropy alloys/coatings for anticorrosion/antibacterial applications -Materials for energy production (H2) & storage (batteries) -Material degradation/corrosion challenges in Oil & Gas, Desalination, Nuclear etc.		
20	Awad Alquaily	awad.alquaily@kfupm.edu.sa	Life Cycle Assessment of Bus Transport in Riyadh	Student will utilize GREET software to compare the carbon footprint of diesel, fuel cell, and electric bus in Riyadh	Sustainability
21	Nesar Merah	nesar@kfupm.edu.sa	#Water filtration using locally synthesized ceramic membranes	Characrterization of mechanically synthesized ceramic membranes by XRD, EDX and SEM along with study of its efficacy in applications for water filtration. This is part of an IRC-AM project.	
22	Dr. Abba Abubakar	abba.abubakar@kfupm.edu.sa	Cold Spray Deposition of Composite Coatings	Cold spray (CS) is a cold-state additive manufacturing technology for metallic parts in which micron-size powder particles are deposited onto a substrate surface via the high-velocity flow of supersonic gas. Composite coatings with tailored properties can be effectively deposited with the cold spray process via careful control of the deposition parameters. To avoid repetitive experiments involving trial and error, numerical models can be used to optimize the process. The present study proposes using a physics-based hybrid simulations to optimize the cold spray deposition parameters. The student is expected to carry out wide range of simulations for cold spray parameters. The results from the numerical simulations will be analyzed and validated by comparing them with that of experiments using real cold spray set up at KFUPM. The coatings microstructure will be characterized, and the effective properties will be measured with the aid of several experimental/analytical tools.	Materials & Manufacturing

23	Dr. Md Abdullah Al Bari	mdabdullahal.bari@kfupm.edu.sa	Techno-Economic Analysis of CO ₂ Electrosynthesis for Value-Added Carbon in the Saudi Arabian Context	In this research, the student will conduct a techno-economic analysis of CO ₂ conversion into value-added products within the Saudi Arabian context. The study will begin by assessing the availability of CO ₂ feedstock in the region, alongside the potential for renewable electricity production. The renewable energy demand will be analyzed, and case studies will be developed to evaluate renewable electricity generation potential across different regions of Saudi Arabia. Finally, the market demand for the synthesized products and the economic viability of this industry will be assessed. The student is only expected to have experience with advanced Excel.	Sustainability and Renewable Energy
24	Dr. Abdul Samad Mohammed	samad@kfupm.edu.sa	Synthesis and characterization of polymer composites reinforced with date palm fiber powder	In this research, the undergraduate student will be working under the supervision of a graduate student, to develop and characterize polymer composites and characterize them. These composites hold a lot of significance in context of the kingdom due to the large amount of the availability of date palm fiber. This research helps in tapping the potential of these fibers in preparing composites with good strength and properties.	Sustainability, Materials & Manufacturing
25	Dr. Abdul Samad Mohammed	samad@kfupm.edu.sa	Synthesis and characterization of polymer composites reinforced with Aloe vera powder	In this research, the undergraduate student will be working under the supervision of a graduate student, to develop and characterize polymer composites and characterize them. These composites hold a lot of significance due to the large amount of the availability of Aloe Vera powder. This research helps in tapping the potential of these natural powders in preparing composites with good strength and properties.	Sustainability, Materials & Manufacturing
26	Dr. Abdul Samad Mohammed	samad@kfupm.edu.sa	Synthesis and characterization of polymer composites reinforced with Crumb rubber powder	In this research, the undergraduate student will be working under the supervision of a graduate student, to develop and characterize polymer composites and characterize them. These composites hold a lot of significance due to the large amount of the availability of crumb rubber from waste and discarded tires. This research helps in tapping the potential of these natural powders in preparing composites with good strength and properties.	
27	Dr. Abdul Samad Mohammed	samad@kfupm.edu.sa	Synthesis and characterization of polymer composites reinforced with Crumb rubber powder	In this research, the undergraduate student will be working under the supervision of a graduate student, to develop and characterize polymer composites and characterize them. These composites hold a lot of significance in the context of the kingdom due to the large amount of the availability of petroleum coke produced from petroleum waste. This research helps in tapping the potential of these natural powders in preparing composites with good strength and properties.	