Scientific research plan

Mechanical Power Engineering Department

2019-2024

Scientific Research Plan for Mechanical Power Engineering Department 2019-2024

The main research field	The sub research field	Research for Academic degrees		Research for Promotions (40%) (Specialized studies)	Applied research projects (10%) (Applied studies)			Scientific department	Research specialization	Priority order
		MSc's subjects (30%)	PHD's subjects (20%) (Innovative studies)		Research project	Proposed budget in (LE.)	Source of funding			
1- Environmental safety and safe food production	--	1- Studies on environmental safety and safe food production.				--	--	Mechanical Power Engineering		2
The main research field	**The sub research field**	**Research for Academic degrees**		**Research for Promotions (40%) (Specialized studies)**	**Applied research projects (10%) (Applied studies)**			**Scientific department**	**Research specialization**	**Priority order**
		MSc's subjects (30%)	**PHD's subjects (20%) (Innovative studies)**		**Research project**	**Proposed budget in (LE.)**	**Source of funding**			
2- Applications of genetic engineering systems and modern technologies in various fields	Bio-technology	1- Studies on enhancing biogas production by maximizing the benefit of the anaerobic fermentation process to protect wastewater. 2- Studies about combustion and emissions characteristics of biofuels. 3- Study of combustion characteristics and emissions from biofuels and agricultural waste.				--	--	Mechanical Power Engineering		2

Scientific Research Plan for Mechanical Power Engineering Department 2019-2024

The main research field	The sub research field	Research for Academic degrees		Research for Promotion (50%) (Specialized studies)	Applied research projects (10%) (Applied studies)			Scientific department	Research specialization	Priority order
		MSc's subjects (25%)	PHD's subjects (15%) (Innovative studies)		Research project	Proposed budget in (LE.)	Source of funding			
3- Optimal use of agricultural and industrial production resources	Conservation of energy consumption	1- Studies on optimal use of agricultural and industrial production resources.				--	--	Mechanical Power Engineering		2

The main research field	The sub research field	Research for Academic degrees		Research for Promotion (55%) (Specialized studies)	Applied research projects (10%) (Applied studies)			Scientific department	Research specialization	Priority order MSc's subjects (30%)
		MSc's subjects (25%)	PHD's subjects (10%) (Innovative studies)		Research project	Proposed budget in (LE.)	Source of funding			
4- New and renewable energy in the agricultural and industrial fields and their economics.	*Wind energy *Solar energy *Hybrid energy	1- Studies on new and renewable energy in the agricultural and industrial fields and their economics 2- Studies on hydrogen storage technology for green solutions for multi-source renewable energy networks. 3- Studies on converting renewable energy into alternative fuels.				--	--	Mechanical Power Engineering		1

Scientific Research Plan for Mechanical Power Engineering Department 2019-2024

		4- Study of hybrid power plants with new and renewable energy sources. 5- Studies on analyzing the performance of a solar desalination system using vacuum tubes with the use of a phase change material. 6- Studies on the effect of sand grain deposition on the blade surface on the performance of wind turbines. 7- Studies on water pumping systems using solar thermal energy using a fountain pump. 8- Studies on the application of multiple flow paths in an evacuated tube solar collector.					

The main research field	**The sub research field**	**Research for Academic degrees**		**Research for Promotion (40%) (Specialized studies)**	**Applied research projects (10%) (Applied studies)**			**Scientific department**	**Research specialization**	**Priority order**
		MSc's subjects (30%)	**PHD's subjects (20%) (Innovative studies)**		**Research project**	**Proposed budget in (LE.)**	**Source of funding**			
5- Developing water resources management and water conservation in irrigation systems of Sharkia Governorate	Water desalination	1- Studies on the safe use of energy-saving pressure exchangers in reverse osmosis desalination plants. 2- Studies on the use of turbochargers to save energy in reverse osmosis desalination systems. 3- Studies on membrane desalination using a pressure exchanger. 4- Laboratory studies on pressure exchangers for use in energy recovery in desalination plants. 5- Various studies on water desalination and the use of nanomaterials in water treatment and desalination.				--	--	Mechanical Power Engineering		1

Scientific Research Plan for Mechanical Power Engineering Department 2019-2024

The main research field	The sub research field	Research for Academic degrees		Research for Promotion (30%) (Specialized studies)	Applied research projects (10%) (Applied studies)			Scientific department	Research specialization	Priority order
		MSc's subjects (30%)	PHD's subjects (30%) (Innovative studies)		Research project	Proposed budget in (LE.)	Source of funding			
6- Recycling agricultural and industrial wastes	--	1- Studies on Recycling agricultural and industrial wastes. 2- Study of combustion and emissions characteristics of biofuels and agricultural wastes.				--	--	Mechanical Power Engineering		3
The main research field	**The sub research field**	**Research for Academic degrees**		**Research for Promotion (40%) (Specialized studies)**	**Applied research projects (20%) (Applied studies)**			**Scientific department**	**Research specialization**	**Priority order**
		MSc's subjects (20%)	**PHD's subjects (20%) (Innovative studies)**		**Research project**	**Proposed budget in (LE.)**	**Source of funding**			
7- Studies on the impact of environmental pollution on humans, plants and animals.	--	1- Studies on the impact of environmental pollution on humans, plants and animals.				--	--	Mechanical Power Engineering		3

Scientific Research Plan for Mechanical Power Engineering Department 2019-2024

The main research field	The sub research field	Research for Academic degrees		Research for Promotion (60%) (Specialized studies)	Applied research projects (20%) (Applied studies)			Scientific department	Research specialization	Priority order
		MSc's subjects (10%)	PHD's subjects (10%) (Innovative studies)		Research project	Proposed budget in (LE.)	Source of funding			
8- Feasibility studies for environmental projects	--	1- Studies on Feasibility studies for environmental projects.				--	--	Mechanical Power Engineering		3

The main research field	The sub research field	Research for Academic degrees		Research for Promotion (20%) (Specialized studies)	Applied research projects (30%) (Applied studies)			Scientific department	Research specialization	Priority order MSc's subjects (30%)
		MSc's subjects (30%)	PHD's subjects (20%) (Innovative studies)		Research project	Proposed budget in (LE.)	Source of funding			
9- Entrepreneurial trend of business and its impact on performance	--	1- Studies on Entrepreneurial trend of business and its impact on performance.				--	--	Mechanical Power Engineering		3

Scientific Research Plan for Mechanical Power Engineering Department 2019-2024

The main research field	The sub research field	Research for Academic degrees		Research for Promotion (40%) (Specialized studies)	Applied research projects (10%) (Applied studies)			Scientific department	Research specialization	Priority order
		MSc's subjects (30%)	PHD's subjects (20%) (Innovative studies)		Research project	Proposed budget in (LE.)	Source of funding			
10- Modern applications of fluid engineering for sustainable development.	* Fluid dynamics * Turbo-machinery. *Aero-dynamics	1- Mathematical and laboratory studies to calculate lift and drag coefficients on various surfaces and objects and to calculate the velocity field around surfaces and objects. 2- Studies on improving the performance of gas turbines used for industrial purposes using artificial neural networks and the Simulink program. 3- Studies of fluid engineering for modern applications and the dynamic performance of hydraulic systems. 4- Studies on the effect of dimensions on stationary pump performance. 5- Studies on the effect of turbine blade cooling on gas turbine performance. 6- Studies on the performance of the convergent-divergent nozzle due to the change in inlet pressure. 7- Studies on the effect of the geometrical shape of the horizontal axis wind turbine blades on its performance. 8- Studies on smoke flow and evacuation plans in tunnels and subway stations. 9- Studies of a gas turbine combustion chamber using methanol. 10- Studies of a herringbone oil separator.			--	--	Mechanical Power Engineering		1

Scientific Research Plan for Mechanical Power Engineering Department 2019-2024

		11- Studies on the effect of centrifugal pump dimensions and shape on its performance. 12- Studies on the effect of flow kinetic vibrations on the aerodynamic properties of pentagraphs in high-speed trains. 13- Studies on natural ventilation in homes. 14- Studies of the performance of the trumpet under different operating conditions. 15- Studies on analyzing the dynamic performance of hydraulic brakes. 16-Studies on diagnosing pump faults using vibration analysis. 17- Modeling fire dynamics, smoke flow, and appropriate evacuation methods.					

The main research field	**The sub research field**	**Research for Academic degrees**		**Research for Promotion (60%) (Specialized studies)**	**Applied research projects (10%) (Applied studies)**			**Scientific department**	**Research specialization**	**Priority order**
		MSc's subjects (20%)	**PHD's subjects (10%) (Innovative studies)**		**Research project**	**Proposed budget in (LE.)**	**Source of funding**			
11- Modern thermal engineering techniques in engineering and industrial applications	* Heat and mass transfer *Combus-tion *Cooling	1- Studies in the science of heat transfer for engineering, industrial and technological applications. 2- Studies on the effect of different pipe sections on heat transfer and flow with and without enhancers. 3- Studies on the different effects of inclination angles, fins, vortex generators, and baffles on convective heat transfer.				--	--	Mechanical Power Engineering		1

	and air condition-ing	4- Studies on various methods to improve and analyze the thermal performance of heat exchanger components . 5- Studies on improving the thermal performance of two-phase heat pipes and heat sinks. 6- Studies of heat transfer on different surfaces. 7- Studies on the performance of internal combustion engines. 8- Various studies on the problems of refrigeration and air conditioning and the effect of different diffusers on the distribution of air conditioning air inside the room. 9- Computational and laboratory studies of the combustion characteristics of different types of fuel (solid-liquid-gas), components of combustion products, and combustion quality. 10- Studies on diagnosing faults in an internal combustion engine (gasoline) using vibration analysis. 11- Studies on prediction of dual-fuel flame characteristics of rice straw powder with gas. 12- Studies on the combustion of liquid hydrogen as an alternative fuel for jet aircraft. 13- Studies on dual combustion of conventional and biofuels in the combustion chamber of gas turbines. 14- Studies on the effect of spiral flow on the performance of heat sinks. 15- Studies on the flow and heat transfer in a tube with protrusions, beams, additional lengths, a different configuration of the tube surface, loops, or a twisted band as a vortex generator. 16- Studies of two-phase heat transfer in a thermosiphon equipped with internal fins.				

Scientific Research Plan for Mechanical Power Engineering Department 2019-2024

		17- Studies on a hybrid thermoelectric-VCR cooler . 18- Studies of flow in micro electro-mechanical systems. 19- Studies on the effect of nano additives on engine performance and emissions. 20- Studies on the use of alternative or biofuel for engines. 21- The use of nano-fluids in heat transfer processes.						
The main research field	**The sub research field**	**Research for Academic degrees**		**Research for Promotion (20%) (Specialized studies)**	**Applied research projects (50%) (Applied studies)**			**Scientific department**	**Research specialization**	**Priority order**
		MSc's subjects (15%)	**PHD's subjects (15%) (Innovative studies)**		**Research project**	**Proposed budget in (LE.)**	**Source of funding**			
12- Mechatronics and aerospace engineering	--	1- Computational and laboratory studies in aerospace engineering and mechatronics.				--	--	Mechanical Power Engineering		1