



Scientific research plan for Electrical power and machines Department (2019-2024)



prioritization	Research Topic	Scientific Department	Practical research projects % 20			promotions Scientific % 20	Research of Academic Degree		Sub- research field	Main research field	State Directions for Scientific Research 20/ 30
			Financial Resources	Proposed Budget (LE)	Research Project		PhD Topics %20	Master Topics %40			
	High Voltage	Power system engineering			1. Study of electrical insulators (gas, liquid, solid) and their collapse and ways of improving their performance. 2. Study of the design, operation and loss of power cables.	1- Study of electrical insulators (gas, liquid, solid) and their collapse and ways of improving their performance 2- Study the design, operation and loss of power cables. 3- Computer applications in electromagnetic fields 4- To study the various electric fields and their effects. 5- Study of various magnetic fields and their effects. 6- Simulation of high effort systems and their artificial intelligence applications. 7- Nanotechnology applications in electric power and insulation cable	1- Study of the electrical - insulators (gas, liquid, solid), their collapse and ways of improving their performance. 2- Study the design, operation and loss of power cables. 3- Computer applications in electromagnetic fields. 4- To study the various electric fields and their effects. 5- Study of various magnetic fields and their effects. 6- Simulation of high effort systems and their artificial intelligence applications. 7- Nanotechnology applications in electric power and insulation cables.	1- Study of Electric insulators (solid – liquid – gas), breakdown and improving performance of insulation methodologies. 2- Study of electrical power system cables design , operation and power losses 3- Computer applications in electromagnetic fields 4- Study of electric field & its different impacts 5- Study of magnetic field & its different impacts 6- Simulation of high voltage systems and artificial intelligence applications therein. 7- Applications of nanotechnology in electrical power cables and insulators.	1- High voltage engineering	1- Advanced technologies and applications in different scientific topics	First : the dimension of an economy includes the following areas: 1- Economic development and energy 2- Science, technology and innovation



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	Renewable energy	Electrical Power Engineering		<p>1-Study of improving the performance of generators used in generating energy from wind.</p> <p>2-Generating energy from solar cells and wind energy in isolated areas.</p> <p>3-Study the different ways to connect new energy generators to the network.</p> <p>4-Study of the homogeneous generation of solar and wind energy.</p> <p>5-Applications of artificial intelligence in solar and wind energy generation.</p> <p>6- Study models and simulations of wind energy generators.</p> <p>7- Study of hybrid generation systems (solar, wind, diesel, etc.) and their impact on the electrical network.</p> <p>8-Study of improving the performance and economics of hybrid network systems</p> <p>9-Applications of nanotechnology in new and renewable energy generation systems.</p>	<p>1-Study of improving the performance of generators used in generating energy from wind.</p> <p>2-Generating energy from solar cells and wind energy in isolated areas.</p> <p>3-Study the different ways to connect new energy generators to the network.</p> <p>4-Study of the homogeneous generation of solar and wind energy.</p> <p>5- Applications of artificial intelligence in solar and wind energy generation.</p> <p>٦-Study models and simulations of wind energy generators.</p>	<p>1-Study of improving the performance of generators used in generating energy from wind.</p> <p>2-Generating energy from solar cells and wind energy in isolated areas.</p> <p>3-Study the different ways to connect new energy generators to the network.</p> <p>4-Study of the homogeneous generation of solar and wind energy.</p> <p>5-Applications of artificial intelligence in solar and wind energy generation.</p> <p>٦-Study models and simulations of wind energy generators</p>	<p>1-Study of improving the performance of generators used in generating energy from wind.</p> <p>2-Generating energy from solar cells and wind energy in isolated areas.</p> <p>٣-Study the different ways to connect new energy generators to the network.</p> <p>4-Study of the homogeneous generation of solar and wind energy.</p> <p>5-Applications of artificial intelligence in solar and wind energy generation.</p> <p>٦- Study models and simulations of wind energy generators</p>	2- New and renewable energy		
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					1-study of the energy saving consumption in Electric drive motors	1- Use the Artificial intelligence in obtaining optimal firing angle for electric drive motor 2- study of the energy saving consumption in Electric drive motors 3-Study of the Decrease in Torque of Electric Motors Due to the Use of Power Electronics Circuits 4- the effect of power electronics on the characteristics of electric drive motor 5- Study of Reducing Torque Oscillations in Electric Motors Supplied by Power Electronics Circuits 6- Application of Nanotechnology in Power Electronics	1- Use the Artificial intelligence in obtaining optimal firing angle for electric drive motor 2- study the Rationalization of energy consumption in Electric drive motors 3-Study of the Decrease in Torque of Electric Motors Due to the Use of Power Electronics Circuits 4- the effect of power electronics on the characteristics of electric drive motor 5- Study of Reducing Torque Oscillations in Electric Motors Supplied by Power Electronics Circuits 6- Application of Nanotechnology in Power Electronics	1- Use the Artificial intelligence in obtaining optimal firing angle for electric drive motor 2- study the Rationalization of energy consumption in Electric drive motors 3-Study of the Decrease in Torque of Electric Motors Due to the Use of Power Electronics Circuits 4- the effect of power electronics on the characteristics of electric drive motor 5- Study of Reducing Torque Oscillations in Electric Motors Supplied by Power Electronics Circuits 6- Application of Nanotechnology in Power Electronics	3-Power Electronics and its application		
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	Electrical Machines	Electrical Power Engineering	Design the electrical machines besides studying the factors influencing its performance and		<p>1-Studying the electrical power rationalized techniques for the electrical motors.</p> <p>2- Studying the modern control techniques like field orientation control and momentum direct control for the electrical motors</p>	<p>1- Designing the electrical machines besides studying the factors influencing their performance and characteristics.</p> <p>2- Applying the artificial intelligence to get the optimal performance of the electrical machines.</p> <p>3- Studying the modern control techniques like field orientation control and momentum direct control for the electrical motors</p> <p>4- Studying the different electrical modeling management techniques.</p> <p>5- Studying the electrical power rationalized consumption techniques for the electrical motors.</p> <p>6- Studying the electrical motors' rated momentum decrement due to the electrical supply imbalance.</p> <p>7- Nano-technology applications in the electrical machines.</p>	<p>1- Designing the electrical machines besides studying the factors influencing their performance and characteristics.</p> <p>2- Applying the artificial intelligence to get the optimal performance of the electrical machines.</p> <p>3- Studying the modern control techniques like field orientation control and momentum direct control for the electrical motors</p> <p>4- Studying the different electrical modeling management techniques.</p> <p>5- Studying the electrical power rationalized consumption techniques for the electrical motors.</p> <p>6- Studying the electrical motors' rated momentum decrement due to the electrical supply imbalance.</p> <p>7- Nano-technology applications in the electrical machines.</p>	<p>1- Designing the electrical machines besides studying the factors influencing their performance and characteristics.</p> <p>2- Applying the artificial intelligence to get the optimal performance of the electrical machines.</p> <p>3- Studying the modern control techniques like field orientation control and momentum direct control for the electrical motors</p> <p>4- Studying the different electrical modeling management techniques.</p> <p>5- Studying the electrical power rationalized consumption techniques for the electrical motors.</p> <p>6- Studying the electrical motors' rated momentum decrement due to the electrical supply imbalance.</p> <p>7- Nano-technology applications in the electrical machines.</p>	5- Electrical Machines		
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Electric power systems					<p>1-Studying the participation of generating units in electrical power systems.</p> <p>2- Studying the scheduling of electrical power generation in electrical power systems.</p> <p>3-Techniques for optimal performance of active and reactive power in power system.</p> <p>4- The use of artificial intelligence systems in integrated prevention systems.</p>	<p>1-Applications of artificial intelligence, expert systems, and neural networks in power systems and their analysis.</p> <p>2-Applications of electrical power distribution systems.</p> <p>3-Studying the participation of generating units in electrical power systems.</p> <p>4-Division of loads in electrical power systems.</p> <p>5-Study the scheduling of electrical power generation in electrical power systems.</p> <p>6-Techniques for optimal performance of active and passive power in power systems Electrophysiology.</p> <p>7-Integrated protection systems for electrical power systems.</p> <p>8- Uses of computers in digital prevention.</p> <p>9- The use of artificial intelligence systems in integrated prevention systems.</p> <p>10-Identifying faults in electrical power systems using expert systems.</p> <p>11-Applications of nanotechnology in electrical power systems.</p>	<p>1-Applications of artificial intelligence, expert systems, and neural networks in power systems and their analysis.</p> <p>2-Applications of electrical power distribution systems.</p> <p>3-Studying the participation of generating units in electrical power systems.</p> <p>4-Division of loads in electrical power systems.</p> <p>5-Study the scheduling of electrical power generation in electrical power systems.</p> <p>6-Techniques for optimal performance of active and passive power in power systems Electrophysiology.</p> <p>7-Integrated protection systems for electrical power systems.</p> <p>8- Uses of computers in digital prevention.</p> <p>9- The use of artificial intelligence systems in integrated prevention systems.</p> <p>10-Identifying faults in electrical power systems using expert systems.</p> <p>11-Applications of nanotechnology in electrical power systems.</p>	<p>1-Applications of artificial intelligence, expert systems, and neural networks in power systems and their analysis.</p> <p>2-Applications of electrical power distribution systems.</p> <p>3-Studying the participation of generating units in electrical power systems.</p> <p>4-Division of loads in electrical power systems.</p> <p>5-Study the scheduling of electrical power generation in electrical power systems.</p> <p>6-Techniques for optimal performance of active and passive power in power systems Electrophysiology.</p> <p>7-Integrated protection systems for electrical power systems.</p> <p>8- Uses of computers in digital prevention.</p> <p>9- The use of artificial intelligence systems in integrated prevention systems.</p> <p>10-Identifying faults in electrical power systems using expert systems.</p> <p>11-Applications of nanotechnology in electrical power systems.</p>	6- Electric power systems		



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									Sustainable and environmentally friendly techniques and materials in structural engineering and building construction	2- Optimal use of various resources and environmental safety	<u>Second: The environmental side includes the following topics</u> Environment and urban development -
									Modern applications of fluid engineering for sustainable development		
									Modern applications of transportation and traffic engineering and their impact on sustainable development		



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