



SESHADRI RAO GUDLAVALLERU ENGINEERING COLLEGE

(An Autonomous Institute with Permanent Affiliation to JNTUK, Kakinada)

Seshadri Rao Knowledge Village, GUDLAVALLERU-521 356, Krishna District, A.P., India

(Approved by AICTE, New Delhi and Permitted by A.P. State Government)

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List of Courses focusing on Local Regional and Global Needs

Courses in Curriculum	Local/ regional needs
B. TECH R 20	
Community Service Project	local need- the team of students work to achieve specific goals and meet the needs of the community or society at the specified time
Electrical and Hybrid Vehicles	Regional need -Electric vehicles use electricity to charge their batteries instead of using fossil fuels like petrol or diesel. Electric vehicles are more efficient, and that combined with the electricity cost means that charging an electric vehicle is cheaper than filling petrol or diesel for your travel requirements
Special Electrical Machines	Regional need- Assembly, welding, marking, cutting, a multitude of operations can be envisaged by special machines.
Induction and Synchronous Machines	Local Need- These motors are used in applications such as power stations, manufacturing facilities, and voltage control in transmission lines.
Utilization of Electrical Energy	Regional need- The major utilization of electrical energy is to generate output from electrical and electronics devices. A part from it utilization of electric energy is in industry, domestic utilization, in commercial usage, in public service, in transport, in fishery etc.
Renewable Energy Sources	Regional Need- Renewable energy sources could decarbonize 90 percent of the power sector by 2050, massively cutting carbon emissions and helping to mitigate climate change.
Electrical Distribution Systems	Local Need- The primary purpose of an electricity distribution system is to meet the customer's demands for energy after receiving the bulk electrical energy from transmission or sub transmission substation.
Switch Gear and Protection	Local Need- Switchgears are used for de-energizing equipment for safe testing, maintenance, and fault clearing.
M. TECH R 20	
Power Quality and Custom Power Devices	Regional Need- The compensating custom power devices are used for active filtering, load balancing, power factor improvement voltage regulating (sag/ swell)
Renewable Energy Technologies	Regional Need- Renewable energy sources could decarbonize 90 percent of the power sector by 2050, massively cutting carbon emissions and helping to mitigate climate change.
Control & Integration of Renewable Energy Systems	Regional Need- Renewable energy sources could decarbonize 90 percent of the power sector by 2050, massively cutting carbon emissions and helping to mitigate climate change.
Hybrid Electric Vehicles	Regional need -Electric vehicles use electricity to charge their batteries instead of using fossil fuels like petrol or diesel. Electric vehicles are more efficient, and that combined with the electricity cost means that charging an electric vehicle is cheaper than filling petrol or diesel for your travel requirements

Courses in Curriculum	Local/ regional needs
M. TECH R 20	
Energy Audit, Conservation & Management	Regional need -An energy audit will identify energy-saving opportunities. It will help you understand your energy usage and ways to use energy better. An energy audit can identify safety concerns with electrical systems, wiring, and ventilation, thus making your home or business safer.
B. TECH R 17	
Electrical and Hybrid Vehicles	Regional need -Electric vehicles use electricity to charge their batteries instead of using fossil fuels like petrol or diesel. Electric vehicles are more efficient, and that combined with the electricity cost means that charging an electric vehicle is cheaper than filling petrol or diesel for your travel requirements
Induction and Synchronous Machines	Local Need- These motors are used in applications such as power stations, manufacturing facilities, and voltage control in transmission lines.
Renewable Energy Sources	Regional Need- Renewable energy sources could decarbonize 90 percent of the power sector by 2050, massively cutting carbon emissions and helping to mitigate climate change.
Switch Gear and Protection	Local Need- Switchgears are used for de-energizing equipment for safe testing, maintenance, and fault clearing.
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Special Electrical Machines	Regional need- Assembly, welding, marking, cutting, a multitude of operations can be envisaged by special machines.
Utilization of Electrical Energy	Regional need- The major utilization of electrical energy is to generate output from electrical and electronics devices. A part from it utilization of electric energy is in industry, domestic utilization, in commercial usage, in public service, in transport, in fishery etc.
Energy Audit Conservation And Management	Regional need -An energy audit will identify energy-saving opportunities. It will help you understand your energy usage and ways to use energy better. An energy audit can identify safety concerns with electrical systems, wiring, and ventilation, thus making your home or business safer.
Solar and Wind Energy Systems	Regional Need- As carbon-free and renewable energy sources, wind and solar can help reduce the world's dependence on oil and gas. These carbon fuels are responsible for harmful greenhouse gas emissions that affect air, water and soil quality, and contribute to environmental degradation and climate change
M. TECH R 17	
Special Machines and Control	Regional need- Assembly, welding, marking, cutting, a multitude of operations can be envisaged by special machines.
Renewable Energy Storage Systems	Regional Need- Renewable energy sources could decarbonize 90 percent of the power sector by 2050, massively cutting carbon emissions and helping to mitigate climate change.

Courses in Curriculum	Linkage with Govt. of India's Initiatives
B. TECH R 20	
Electrical and Hybrid Vehicles	Fame-India- To reduce pollution caused by diesel and petrol-operated vehicles and to promote manufacturing of electric and hybrid vehicles one should learn this course.
Renewable Energy Sources Utilization of Electrical Energy	Ujwal Bharat- It is focused on illuminating the life of every Indian. Aims to inculcate Implementation of power projects, training and manpower development.
M. TECH R 20	
Renewable Energy Technologies Control & Integration of Renewable Energy Systems	Ujwal Bharat- It is focused on illuminating the life of every Indian. Aims to inculcate Implementation of power projects, training and manpower development.
Hybrid Electric Vehicles	Fame-India- To reduce pollution caused by diesel and petrol-operated vehicles and to promote manufacturing of electric and hybrid vehicles one should learn this course.
Smart Grid Technologies	National Smart Grid Mission- The primary aim of the <i>Smart Grids</i> is to improve reliability of the Electricity networks and make the grid amenable to renewable energy inputs
B. TECH R 17	
Renewable Energy Sources Solar and Wind Energy Systems Energy Audit Conservation and Management Electrical Costing and Estimation Integration of Renewable Energy Sources Electrical Power Utilization	Ujwal Bharat- It is focused on illuminating the life of every Indian. Aims to inculcate Implementation of power projects, training and manpower development.
Electric and Hybrid Vehicles	Fame-India- To reduce pollution caused by diesel and petrol-operated vehicles and to promote manufacturing of electric and hybrid vehicles one should learn this course.
Smart Grid Technologies	National Smart Grid Mission- The primary aim of the <i>Smart Grids</i> is to improve reliability of the Electricity networks and make the grid amenable to renewable energy inputs
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Renewable Energy Storage Systems	Ujwal Bharat- It is focused on illuminating the life of every Indian. Aims to inculcate Implementation of power projects, training and manpower development.
Smart Grids	National Smart Grid Mission- The primary aim of the <i>Smart Grids</i> is to improve reliability of the Electricity networks and make the grid amenable to renewable energy inputs

Courses in Curriculum	Global thrust areas
B. TECH R 20	
Microprocessors, Microcontrollers & its Applications**	Increasing demand for connected devices coupled with increased adoption of internet of things technology would imply growth in the microcontroller market value
Automation of Electrical Systems Using IoT	IoT and automation can work together to power security systems .IoT and automation help tackle compliance, efficiency, safety, and other longstanding problems
Computer Graphics	Computer graphics is a core technology in digital photography, film, video games, digital art, cell phone and computer displays, and many specialized applications. A great deal of specialized hardware and software has been developed, with the displays of most devices being driven by computer graphics hardware. It is a vast and recently developed area of computer science.
Remote Sensing & GIS	Geographic information systems have emerged in the last decade as an essential tool for urban and resource planning and management and of late used in the management of pandemics like COVID-19 around the globe. Their robustness of GIS to store, retrieve, analyse, model and map large areas with huge volumes of spatial data has led to an extraordinary proliferation of applications
Renewable Energy Sources	Renewable energy resources exist over wide geographical areas, in contrast to fossil fuels, which are concentrated in a limited number of countries. Deployment of renewable energy and energy efficiency technologies is resulting in significant energy security, climate change mitigation, and economic benefits
Automotive Electronics	Automotive electronics technologies such as autonomous driving, all-electric cars, and in-car infotainment are the new trends in the automotive industry. Automotive electronics are predicted to constitute near a third of the total cost of the entire car.
Network Programming	development and analysis of network protocols, architectures and related technologies.
Cyber Security	Cybersecurity helps to protect individuals, organizations, and governments from cyber attacks that can result in data theft, financial loss, and reputational damage. It also ensures the confidentiality, integrity, and availability of information and systems. As more and more devices become connected to the internet, and more sensitive data is transmitted online, the importance of cybersecurity will only continue to grow.
Intelligent Systems	Intelligent systems, which include artificial intelligence (AI), machine learning, and other forms of advanced analytics, can automate routine tasks, analyze large volumes of data, and provide insights that can inform strategic decision-making. The demand for intelligent systems is likely to continue to grow as businesses and governments seek to leverage the power of data and AI to achieve their goals.

Courses in Curriculum	Global thrust areas
Introduction to IoT Architecture	Understanding IoT architecture is important because it can help businesses and organizations to develop scalable and interoperable IoT solutions that can integrate with existing systems and infrastructure. It can also help to ensure the security, privacy, and reliability of IoT systems by identifying potential vulnerabilities and implementing best practices for data management and device security
Introduction to Smart Sensors	Understanding smart sensors is important because they can help businesses and organizations to optimize their operations, reduce costs, and improve the quality of their products and services. They can also enable new applications and business models, such as predictive maintenance, personalized healthcare, and smart city services.
3D Printing Technologies	3D printing technologies have the potential to revolutionize supply chains and logistics by enabling the production of parts and products on-demand, reducing inventory and transportation costs, and improving response times
DevOps	DevOps has become increasingly important as more businesses and organizations move to cloud computing and microservices architectures, which require more frequent and automated software deployments. As a result, the demand for DevOps professionals and tools is expected to continue to grow, making it essential for individuals and organizations to understand and adopt DevOps practices
AI Chatbots	AI chatbots are becoming increasingly sophisticated, with the ability to understand and respond to complex user requests, integrate with other systems and platforms, and learn from user interactions to improve their performance over time. As the demand for efficient and personalized customer service and support continues to grow, the adoption of AI chatbots is expected to increase, making it essential for individuals and organizations to understand and leverage their capabilities.
Trends in IoT	The trends in IoT is important because it can help individuals and organizations to stay up-to-date with the latest advances and applications, and leverage them to develop innovative products and services that can improve efficiency, reduce costs, and enhance customer experience
Data Structures	Data structures are a critical component of many algorithms and data processing techniques, such as sorting, searching, and graph traversal. They are also important for database design, data analysis, and machine learning, which are becoming increasingly important in many industries.
Electrical and Hybrid Vehicles	The growth of the electric vehicle industry, creating new opportunities for innovation and investment, and making it essential for individuals and organizations to understand and participate in this growing market.

Courses in Curriculum	Global thrust areas
Power System Operation and Control	Effective power system operation and control is essential for managing the variability of renewable energy sources and integrating them into the power system without compromising stability and reliability
Big Data Analytics	The ability to process and analyze large and complex data sets is becoming a key competitive advantage in many industries, making it essential to stay up-to-date with the latest advances and applications in this field
High Voltage Engineering	High voltage engineering is important because it is critical for ensuring the safety, reliability, and efficiency of power transmission and distribution systems. This involves the design, construction, testing, and maintenance of high voltage equipment and systems, such as transformers, circuit breakers, and transmission lines.
Flexible AC Transmission Systems	FACTS can help to manage the variability of renewable energy sources and integrate them into the power system without compromising stability and reliability. The ability to design, deploy, and operate FACTS technology is becoming a key competitive advantage in the power industry, making it essential to stay up-to-date with the latest advances and applications in this field.
Introduction to AI Techniques	AI techniques are becoming increasingly important with the proliferation of Internet of Things (IoT) devices and the increasing digitization of various industries. This is creating vast amounts of data that can be analyzed using AI techniques to gain valuable insights and inform decision-making.
Programmable Logic Controllers & Applications	PLCs are becoming increasingly important with the rise of Industry 4.0 and the digitization of various industries. This is creating a need for advanced PLC systems that can integrate with other digital technologies, such as IoT devices, artificial intelligence, and cloud computing.
Advanced Power Electronic Converters	APECs is important because they can improve the efficiency and reliability of power conversion systems, which can result in significant energy savings and reduce the environmental impact of various industries.
Special Electrical Machines	SEMS provide a high level of performance and efficiency in various applications, which can result in significant energy savings and improved reliability. This involves the design, modeling, and control of SEMs, which can range from small and simple to large and complex.
Power Semiconductor Drives	SDs can also be used in various home appliances, such as air conditioners and refrigerators, which require energy-efficient and quiet operation
Principles of VLSI Design	Principles of VLSI Design is important because it enables engineers to create efficient and reliable integrated circuits that can be used in a variety of applications

Courses in Curriculum	Global thrust areas
Switch Gear & Protection	switchgear and protection systems are critical components in electrical power systems, used to protect equipment and maintain power quality. As the demand for reliable and efficient power systems continues to grow worldwide, the need for effective switchgear and protection systems is expected to increase, making it essential for individuals and organizations to understand and leverage their capabilities in this field
Fuzzy Mathematics	As the amount of data generated by modern technology continues to increase, the need for effective methods for handling uncertainty and imprecision is expected to grow. Fuzzy mathematics provides a powerful framework for dealing with these challenges, making it an essential area of study for individuals and organizations in various fields, including engineering, computer science, economics, and more
Python Programming	As the demand for automation, machine learning, and artificial intelligence continues to grow, the need for Python programming is expected to increase. This makes it an essential language to learn for individuals and organizations in various fields, including data science, artificial intelligence, software development, and education
Analog and Digital IC Applications	Analog and digital ICs are used in a wide range of consumer electronics, such as smartphones, laptops, and televisions, to improve performance and reduce power consumption. As the demand for smaller, more efficient, and higher-performance electronic systems continues to grow, the need for analog and digital IC applications is expected to increase
Digital Circuits	Digital circuits are used in a wide range of consumer electronics, such as digital cameras, MP3 players, and gaming consoles.
M. TECH R 20	
Digital Signal Processor Controlled Drives	DSP-controlled drives can improve the energy efficiency of motor-driven systems by minimizing energy losses and optimizing motor performance. This can help reduce energy consumption and save cost
Smart Grid Technologies	Smart grids can enable demand response programs that allow consumers to adjust their electricity usage during periods of high demand. This helps to reduce peak demand and improve the efficiency and reliability of the power system.
Hybrid Electric Vehicles	The growth of the electric vehicle industry, creating new opportunities for innovation and investment, and making it essential for individuals and organizations to understand and participate in this growing market.
Control & Integration of Renewable Energy Systems	Renewable energy resources exist over wide geographical areas, in contrast to fossil fuels, which are concentrated in a limited number of countries. Deployment of renewable energy and energy efficiency technologies is resulting in significant energy security, climate change mitigation, and economic benefits

Courses in Curriculum	Global thrust areas
Power Electronic Control of Electrical Drives	Power electronic control of electrical drives is used in medical devices, such as ventilators and surgical robots, to control the motion and positioning of various components. This helps to improve the accuracy and safety of medical procedures.
B. TECH R 17	
Digital Circuit Design	Digital circuits are used in a wide range of consumer electronics, such as digital cameras, MP3 players, and gaming consoles.
Biomedical Engineering	The world faces several global health challenges, such as infectious diseases, maternal and child health, and access to clean water and sanitation. Biomedical engineering can contribute to solving these challenges by developing innovative technologies and solutions.
Nano Electronics	The demand for smaller, faster, and more efficient electronic devices is increasing. Nano electronics enables the creation of smaller devices with higher performance and lower power consumption
Solar and Wind Energy Systems	Dependence on fossil fuels can create vulnerabilities in energy supply, making countries more susceptible to price spikes and supply disruptions. Solar and wind energy systems can help increase energy security by diversifying energy sources and reducing dependence on imported fuels.
Engineering Optimization	As the world's population continues to grow, the demand for resources, such as energy, water, and raw materials, is increasing. Engineering optimization can help reduce waste and improve efficiency, enabling the world to do more with less.
Introduction to Python Programming	As the demand for automation, machine learning, and artificial intelligence continues to grow, the need for Python programming is expected to increase. This makes it an essential language to learn for individuals and organizations in various fields, including data science, artificial intelligence, software development, and education
Computer Graphics	Computer graphics is a core technology in digital photography, film, video games, digital art, cell phone and computer displays, and many specialized applications. A great deal of specialized hardware and software has been developed, with the displays of most devices being driven by computer graphics hardware. It is a vast and recently developed area of computer science.
Systems Software	As computing systems become more complex, the need for systems software to manage and coordinate these systems becomes more critical. Systems software enables the effective operation of hardware and software systems, and ensures that they work together seamlessly.
Web Programming	The internet has become an essential source of information for people around the world. Web programming enables the creation of websites and applications that provide access to information, such as news, educational resources, and public services.
Automotive Electronics	Automotive electronics technologies such as autonomous driving, all-electric cars, and in-car infotainment are the new trends in the automotive industry. Automotive electronics are predicted to constitute near a third of the total cost of the entire car.

Courses in Curriculum	Global thrust areas
Data Science	Advances in artificial intelligence and machine learning have created new opportunities for data science. Data scientists can use these technologies to develop predictive models, automate decision-making processes, and enable intelligent systems.
Cyber Laws	As more and more information is stored and transmitted electronically, the risk of cyber attacks and data breaches increases. Cyber laws can help protect individuals and organizations from these threats by establishing legal standards for data privacy, security, and breach notification
Electrical and Hybrid Vehicles	The growth of the electric vehicle industry, creating new opportunities for innovation and investment, and making it essential for individuals and organizations to understand and participate in this growing market.
Renewable Energy Sources	Renewable energy resources exist over wide geographical areas, in contrast to fossil fuels, which are concentrated in a limited number of countries. Deployment of renewable energy and energy efficiency technologies is resulting in significant energy security, climate change mitigation, and economic benefits
Cyber Security	Cybersecurity helps to protect individuals, organizations, and governments from cyber attacks that can result in data theft, financial loss, and reputational damage. It also ensures the confidentiality, integrity, and availability of information and systems. As more and more devices become connected to the internet, and more sensitive data is transmitted online, the importance of cybersecurity will only continue to grow.
Modern Optimization Techniques	As the world's population continues to grow, the demand for resources, such as energy, water, and raw materials, is increasing. Engineering optimization can help reduce waste and improve efficiency, enabling the world to do more with less.
Fuzzy Logic	As the amount of data generated by modern technology continues to increase, the need for effective methods for handling uncertainty and imprecision is expected to grow. Fuzzy mathematics provides a powerful framework for dealing with these challenges, making it an essential area of study for individuals and organizations in various fields, including engineering, computer science, economics, and more
Digital Forensics	The rise of cybercrime, including hacking, cyber espionage, and identity theft, has created a need for digital forensics to help identify perpetrators, gather evidence, and support criminal investigations.
Switch Gear & Protection	switchgear and protection systems are critical components in electrical power systems, used to protect equipment and maintain power quality. As the demand for reliable and efficient power systems continues to grow worldwide, the need for effective switchgear and protection systems is expected to increase, making it essential for individuals and organizations to understand and leverage their capabilities in this field

Courses in Curriculum	Global thrust areas
Data Structures	Data structures are a critical component of many algorithms and data processing techniques, such as sorting, searching, and graph traversal. They are also important for database design, data analysis, and machine learning, which are becoming increasingly important in many industries.
Embedded System Design	embedded system design is significant, and the field is critical in addressing the world's technological and social challenges. Embedded system designers are in high demand, and the skills and expertise they bring are essential to organizations across many industries and sectors.
Principles of VLSI Design	Principles of VLSI Design is important because it enables engineers to create efficient and reliable integrated circuits that can be used in a variety of applications
DSP Processors and Architecture	DSP processors and architecture are used in wireless and wireline communication systems to transmit and receive data. They are used in applications such as cell phones, modems, and cable modems.
Big Data Analytics	The ability to process and analyze large and complex data sets is becoming a key competitive advantage in many industries, making it essential to stay up-to-date with the latest advances and applications in this field
Power Semiconductor Drives	SDs can also be used in various home appliances, such as air conditioners and refrigerators, which require energy-efficient and quiet operation
Flexible AC Transmission Systems	FACTS can help to manage the variability of renewable energy sources and integrate them into the power system without compromising stability and reliability. he ability to design, deploy, and operate FACTS technology is becoming a key competitive advantage in the power industry, making it essential to stay up-to-date with the latest advances and applications in this field.
Digital Image Processing	digital image processing is significant, and the field is critical in addressing the world's technological and social challenges. Digital image processing experts are in high demand, and the skills and expertise they bring are essential to organizations across many industries and sectors.
Artificial Intelligent Techniques	AI techniques are becoming increasingly important with the proliferation of Internet of Things (IoT) devices and the increasing digitization of various industries. This is creating vast amounts of data that can be analyzed using AI techniques to gain valuable insights and inform decision-making.
HVDC Transmission	HVDC transmission can help stabilize power grids by allowing for the transfer of power between different regions, which helps to balance the load on the grid and prevent blackouts.
High Voltage Engineering	High voltage engineering is important because it is critical for ensuring the safety, reliability, and efficiency of power transmission and distribution systems. This involves the design, construction, testing, and maintenance of high voltage equipment and systems, such as transformers, circuit breakers, and transmission lines.

Courses in Curriculum	Global thrust areas
M. TECH R 17	
AI Techniques	AI techniques are becoming increasingly important with the proliferation of Internet of Things (IoT) devices and the increasing digitization of various industries. This is creating vast amounts of data that can be analyzed using AI techniques to gain valuable insights and inform decision-making.
Smart Grids	Smart grids can enable demand response programs that allow consumers to adjust their electricity usage during periods of high demand. This helps to reduce peak demand and improve the efficiency and reliability of the power system.
Renewable Energy Storage Systems	Renewable energy resources exist over wide geographical areas, in contrast to fossil fuels, which are concentrated in a limited number of countries. Deployment of renewable energy and energy efficiency technologies is resulting in significant energy security, climate change mitigation, and economic benefits
Application of power Electronics to Power Systems	Power electronics technology is essential for energy storage systems, such as batteries, flywheels, and supercapacitors. These systems can store excess energy generated by renewable energy sources and release it during periods of high demand.
HVDC Transmission Systems	HVDC transmission can help stabilize power grids by allowing for the transfer of power between different regions, which helps to balance the load on the grid and prevent blackouts.
Advanced Electric Drives	Advanced electric drives are essential for electric vehicles, including cars, buses, and trains. These drives can improve the performance and efficiency of the vehicle, as well as extend the range of the vehicle.




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