

# OPEN HOUSE & JOB FAIR 2019



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FACULTY OF ELECTRICAL  
ENGINEERING

# ABSTRACTS

ELECTRICAL  
ENGINEERING  
DEPARTMENT

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**ELECTRICAL  
ENGINEERING  
DEPARTMENT**

<b>Project Title:</b>	<b>Analysis and Design of a Fully Electronic On Load Tap Changer Transformer for Automatic Voltage Regulation.</b>
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<b>Abstract:</b>	<p>Voltage regulation is very important as per power quality aspects. Various devices are used in distribution system to maintain the voltage in well-defined limits. As the transformer is an integral part of distribution system Taps in the transformer winding are used to regulate the voltages. On-load tap changers (OLTC) are being used for this purpose which regulates the voltages without any interruption in continuity of supply. Fully Electronic on load tap changer serve as a best solution for the present grid problems like voltage sag and swell. Moreover, it can also handle power quality issues efficiently and economically.</p>

<b>Project Title:</b>	<b>Fuel Efficient Self Generation Locomotive</b>
<b>Students:</b>	Tayyeb Ahmed (15-EE-57) Talha Ahmed Rajpoot (15-EE-121) M.Zeeshan Dilawar (15-EE-169) Zeshan Ali (15-EE-185)
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<b>Abstract:</b>	<p>The main goal of this study is to analyze, design and fabricate a power distribution system on self-generation locomotive's load with goal of providing optimized solution at minimal cost and fuel consumption. This study includes the complete design of load management system including three input sources that provide electrical energy to the load. This model utilizes solar electrical energy, regenerative braking energy as well as the pre-existing non-renewable input source i.e. the gen sets. The main goal of this study is to minimize the fuel consumption of the gen sets that does not only contribute towards a major cause of global warming but is in limited amount on the planet. Finally, the model is implemented on a smaller analogous scale and adequate testing is carried out to obtain satisfying results.</p>



<b>Project Title:</b>	<b>Design &amp; Development of 2Kv Working Prototype of High Voltage Lab</b>
<b>Students:</b>	Noor Zanib(15-EE-13) Zeenat Siddiqui (15-EE-77)
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<b>Abstract:</b>	This project is an attempt to develop a small table top working prototype of High Voltage Lab of the Electrical Engineering Department of University of Engineering and Technology, Taxila in order to carry out the demonstration of many concepts of high voltage e.g generation and measurement of HVAC & HVDC, demonstration of the breakdown in gases, liquids and solids, and insulation testing. The hardware developed is rated up to 2KV, and components featured are small size, comparatively light in weight, and Cheap.

<b>Project Title:</b>	<b>Design and Implementation of Variable Frequency Drive for Three Phase IM</b>
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<b>Abstract:</b>	<p>This project based on the design and implementation of variable frequency drive by the Variable Voltage Variable Frequency (VVVF) scheme based on Sinusoidal Pulse Width Modulation (SPWM) technique for a three-phase induction motor has been applied for use. The work involves implementation of a closed-loop control scheme for an induction motor using micro controller. The VVVF technique is used extensively in the industry as it provides the accuracy required at minimal cost. For the stator flux estimation, the value of voltage to frequency ratio is accordingly required. However, estimating stator flux is complicated and even adopting flux sensors increase the cost, so micro controller is used. In this project, complex and economic problems are solved by simplified flux estimation through VVVF control. The analysis is made with 1 hp induction motor which used for experiment and act as a load. The implementation of VVVF drive validity is demonstrated by experimental results.</p>

<b>Project Title:</b>	<b>Design of Smart Solar Based Home Automation using IOTs</b>
<b>Students:</b>	Muhammad Zakir Baig (15-EE-69) Abdullah Sajjad (15-EE-84) M. Munawar Shahzad (15-EE-85) Abdul Haseeb (15-EE-101)
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<b>Abstract:</b>	<p>In the modern era, researchers are trying to automate and control every appliance, wirelessly via android mobiles. Different home automation systems have been developed to control home appliances using IoTs via android mobiles, where IoT is the linkage of devices with Internet and between different devices using different networking protocols and sensing elements. This project comprises of a switchboard and mainboard. The purpose of switchboard is to control the appliances from anywhere in the world through internet and it can control four appliances out of which three are ON/OFF and one is dimmable for fan. The switchboard also has sensor in it that senses the room temperature and humidity. Moreover, the switchboard is given the shape of product such that it is easily installable on existing old-fashioned switchboards. The other part is the mainboard that is fed with two sources; national grid and solar (as the title indicates). The mainboard is programmed in such a way that it gives priority to the solar in order to reduce electricity bills and prevents sudden interruption of power by switching to the alternate source in minimum time.</p>

<b>Project Title:</b>	<b>Home Energy Management System (HEMS)</b>
<b>Students:</b>	Fatir Burhan (15-EE-001) Rida Batool (15-EE-065) Abdul Mannan (15-EE-125) Areeba Shamim (15-EE-009)
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<b>Abstract:</b>	<p>Partial discharge is an indication of progressive degradation of insulation approaching eventual failure.</p> <p>Partial discharge is now a days a hot topic in the study of high voltage. Severe consequences can be faced if not detected timely. This project “Design &amp; Development of Partial discharge Measuring System” is offered by Dr. Salman Amin. Sole purpose of this project is to measure P.D. signal using MATLAB software following the cost-efficient approach. This project will help to detect beforehand identification of critical faults in electrical insulation, scheduling the preventive maintenance of electrical insulation and identification of severely deteriorated equipment for switch gear, transformer and other devices.</p>

<b>Project Title:</b>	<b>Smart Energy Management System with Improved Monitoring Control</b>
<b>Students:</b>	Ibsan Mall(15-EE-141) Aabshar Khan(15-EE-21) Misbah Hassan Abbasi(15-EE-05) Zara Ahmad(15-EE-109)
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<b>Abstract:</b>	The deployment of Internet of Things (IoT) in systems has made smart homes energy efficient, secure and remotely accessible. This project designs a system that provides smart monitoring and switching of loads and sources (WAPDA and Solar) for reducing the units consumed and hence the electricity bills. This is achieved by integrating Arduino, IoT platform and Blynk application. Arduino is employed as a processing unit, NodeMCU 12-E as communication interface, Relays as switching interface and Blynk app as controlling and monitoring interface. This model contributes to design a system that would make home energy monitored, manageable and efficient.

<b>Project Title:</b>	<b>Design and Development of Control drive for Induction Machine.</b>
<b>Students:</b>	Waqas Akram (15-EE-41) Sabir Hussain (15-EE-81) Asad Shafiq (15-EE-117) Arslan Munir (15-EE-131)
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<b>Abstract:</b>	<p>Grain milling is old human history. Grain milling refers to process of grinding grain into flour or meal. The grinding of grain occurs by application of mechanical force that alter the structure of the grain by overcoming the interior binding forces, after which the state of solid is changed to flour. In modern mills this is done by steel crushers and grinders, due to crushing, heat burn occurs which is the main cause of damaging almost 80% of flour nutrient. So we are designing and constructing motorized grain milling machine whose main objective is to preserve the important nutrients of flour which are lost during crushing and to minimize the cost. This machine is basically consisting of two stones, one is called 'quern' (static) and other is called 'hand stone' (moveable) which will be rotated with motor and drive to control its motion. We will keep in check the temperature and humidity of grinding region and motor will adjust its speed to keep them in range according to ISO standards.</p>

<b>Project Title:</b>	<b>Design and Development of Gas Dielectric Capacitor for Partial Discharge</b>
<b>Students:</b>	Mirza Naveed Zia (15-EE-97) Muhammad Ismail (15-EE-157) Hafiz Tahir (15-EE-153) Zoha Zulfiqar (15-EE-137)
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<b>Abstract:</b>	<p>Partial discharges (PD) are one of the main fault and ageing mechanisms in an insulation system. Partial discharge (PD) is a localized dielectric breakdown (DB) of a small portion of a solid or fluid electrical insulation (EI) system under high voltage (HV) stress, which does not bridge the space between two conductors.</p> <p>So, in this project we are going to design a capacitor which will be based on Gaseous dielectric for partial discharge. Gas dielectric basically A material in Gaseous state. Its main purpose is to prevent or rapidly quench electric discharges.</p>

<b>Project Title:</b>	<b>Development of Virtual Reality based driving simulator for training and road safety</b>
<b>Students:</b>	Muzzamil Mehmood (15-EE-37) Mohammad Awais (15-EE-93)
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<b>Abstract:</b>	<p>We have designed a driving simulator with hardware experience for training purpose having real environment visualization. The environment will be developed in unity 3d and displayed on the LCD. Frame for the driving experience of the real vehicle will contain steering, gear-set, accelerator and brake.</p> <p>The software-based environment will simulate and control the traffic with the traffic signals. Instructions will also be provided to ease the driver. We are looking forward to provide better drivers to the society. This will also help in decreasing the numbers of accidents and the casualties that happen due to careless driving.</p>



<b>Project Title:</b>	<b>Unmanned Ground Vehicle with Serial Manipulator</b>
<b>Students:</b>	Awais Tanveer (15-EE-42) M.Hamza Ali (15-EE-82) Inam Ullah Khan(15-EE-86) Usama Khalid(15-EE-114)
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<b>Abstract:</b>	<p>Implemented project is a multipurpose remotely controlled Unmanned ground vehicle. Capable of performing indoor and outdoor operations together with Surveillance features. Robot system is attributed with an unlimited telemetry control range through the use of express if technologies i.e. "Internet of Things". The robot system is controlled with real time database using google Firebase server. The robot system is attributed with real time wide angle video streaming through FPV Analog camera, enhanced mobility to tackle obstacles and to climb stairs with use of Flappers, easy to control with Dual Shock-2 hand grip controller. Robot system is also localized through GPS sensors and operator can explore robot location on specially designed application on android pocket device. A serial manipulator has also been added on the base that is controlled through Joysticks and push buttons, manipulator is fully capable for pick and place of object, setting of camera view angle. Fabrication of robot has been crafted in the respective of CAD model.</p>

<b>Project Title:</b>	<b>Autonomous Car Using Image Processing</b>
<b>Students:</b>	Hamza Sulaiman (15-EE-14) Sonia Iqbal (15-EE-68) Mubashar Masood (15-EE-74) Qasim Mehboob (15-EE-190)
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<b>Abstract:</b>	Travelling by car is currently one of the deadliest forms of transportation, with over a million deaths reported annually worldwide. According to a survey conducted in 180 countries and published as “The Global Status Report on Road safety”, an estimated 1.25 million people dies in road accidents each year. The major cause of these causalities is driver error which includes usage of mobile phones while driving, listening songs or watching movies on built in entertainment system and abundant traffic. So, it is essential to replace the driver with an intelligent system which make decisions according to the situation to help save mankind. Our project demonstrates fundamental key aspects that should be incorporated in an autonomous vehicle.

<b>Project Title:</b>	<b>Speed Control of Induction Motor using PLC</b>
<b>Students:</b>	Ehtsham Ul Hassan (15-EE-78) Rashna Abbas (15-EE-73) Arfan Shehzad (15-EE-100) Nida Khalid (15-EE-105)
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<b>Abstract:</b>	<p>Industrial automation is a necessity now-a-days. There is no concept of industries without automation therefore industries use different tools for automation and Programmable Logic Controller (PLC) is one of the most used automation tool in Pakistan to increase reliability, system stability and performance in industries. PLC minimizes human error by continuously monitoring the received information from input devices or sensors. In this project we aim to design a model of system that uses PLC to control speed and direction of a single-phase Induction motor. We are using Triac BT136 with transistor irf3205 to connect the motor to PLC with hope to reduce cost and increase efficiency of motor control system. Triac will control the speed of motor by changing the amplitude of ac signal given to the motor. This speed controlled induction motor can be used for various industrial applications like Conveyor belts, Compressors and Drilling machines etc.</p>

<b>Project Title:</b>	<b>Real -Time Visualization, Monitoring and Efficient use of Electrical Energy via IOT</b>
<b>Students:</b>	Zulfiqar Ali (15-EE-98) Anjum Iqbal (15-EE-102) Talha Munir(15-EE-146) Summeyya Habib(15-EE-178)
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<b>Abstract:</b>	Remote Monitoring visualize and Control is one of the most important and necessary criteria to reduce energy consumption. This Project present a concept of how commercial building can be monitored and controlled via IOT technology from anywhere in the world on supported portable devices. Among the wireless technology protocols, the ESP becomes the new standard intended for low cost devices in automation, home controls. An additional monitoring approach in this system is web server based online visualization, monitoring and controlling of electrical parameters. In this system one ESP which is called ESP 8266-12E is responsible to link data with PC, and another ESP which is connected to Arduino controller. The whole system is divided into two parts transmitter and receiver. In the transmitter part or collection part, a network of circuits are used to collect the data of parameters. The monitoring data is simultaneously fed to the Arduino controller. The collection data is transmitted efficiently and smoothly to receiver end

<b>Project Title:</b>	<b>Design of an IOT Application for Smart Home Management System</b>
<b>Students:</b>	Mustanser Tahir (15-EE-54) Omer Akhtar (15-EE-54) M. Adnan (15-EE-130) M. Rehan (15-EE-150)
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<b>Abstract:</b>	<p>The project is about the design of an IOT application for the load control of few appliances. The loads are controlled and monitored on cloud server through internet connection. The use of internet provides the data communication and data measurement at any time anywhere. Lacking the advancing technology in distribution systems results in loses because of in-availability of monitoring at the sub-stations. The purpose of designing IOT application for home appliances is to extend the idea to distribution level in future, where the components of distribution system can be controlled through internet from any substation using the specific client IDs assigned to the distribution system. The IOT application consists of current sensors (ACS 712) that measure the current of appliances, voltage sensors that measure the voltage. Each sensor is connected to the relays in order to switch ON/OFF the appliances. The data is provided to the cloud server using wifi module (ESP8266). Wifi module is a programmable controlling device that provides the data at the cloud server. From drag and drop cloud server (Cayenne MQTT) where data can be monitored, stored and controlled easily.</p>

<b>Project Title:</b>	<b>Active Damping System</b>
<b>Students:</b>	Muhammad Ali(15-EE-030) Waqar Kamran(15-EE-182) Talha Habib Farooqui(15-EE-160)
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<b>Abstract:</b>	<p>Vibration control is of utmost importance in electro-mechanical systems. The work has been done to study the effects of damping by changing the damping ratio using electromagnet. Damping is done by the application of electromagnet along with a permanent magnet. A current controller is used to provide the desired current input to electromagnet. This study includes the damping effects by changing the input current which is varied by the help of PWM (Pulse width modulator) and hence change in the damping ratio. The results of PWM and current are directly proportional to the damping ratio. Experimental results are presented effectively.</p>

<b>Project Title:</b>	<b>Design and Fabrication of Prototype for Management of Electrical Loads</b>
<b>Students:</b>	RizwanDilbar (15-EE-122) Mohsin Zubair (15-EE-110) Khawaja Hussain (15-EE-34) Syed Daniyal (15-EE-95)
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<b>Abstract:</b>	<p>Energy governance devices are commonly used in manufacturing industries and houses to monitor and manage energy consumption. In contrast to the business and industrial sectors, the housing industry consists of various tiny energy consumers such as buildings, mobile homes and flats. Research has shown that these housing energy customers waste nearly 41 times of the power provided to their households. Changes in voltage, energy consumption, power factor and current variables for such facilities must be evaluated. Fundamental understanding of how energy is produced, monitored and regulated is a main prerequisite for an energy management system. When users know that when and where energy is being utilized, they can then reduce the energy consumption, thus minimizing energy losses and power cost.</p>

<b>Project Title:</b>	<b>Industrial Automation Processes using PLC</b>
<b>Students:</b>	Hamza Abbas Malik (15-EE-50) Arfan Wahlah (15-EE-66) Hamza Mueeze Shakir(15-EE-90)
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<b>Abstract:</b>	<p>Due to the comprehensive development in the industries, efficiency is necessary. In most of the industries placement of objects i.e. picking and dropping of the object from and to the desired location is quite a task. It is usually done through manual means and is not as efficient as an automated system.</p> <p>An electronic prototype (13ft long, 6ft wide and 5ft tall) is designed to demonstrate the behaviour of our idea. The system involved consists of both Mechanical and Electronic Units. The whole crane first moves along z axis to reach the pickup point, then it automatically moves along the y axis to pick up the required object. Finally, it moves along x-axis to reach the drop point. In this way all the three axes are covered. As a result, not only, precise movement was achieved rather the whole system was automated.</p>



<b>Project Title:</b>	<b>Design and Fabrication of Electromagnetic Forming Machine for Metal Forming &amp; Crimping</b>
<b>Students:</b>	Muhammad Talha Aamir(15-EE-158) M Haris Aman(15-EE-138) Muhammad Arslan(15-EE-106)
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<b>Abstract:</b>	Electromagnetic pulse forming machine utilizes high intensity discharge of capacitors to create a magnetic field that is used to improve the quality and to lower the time of formation of the desired product formed by the process of crimping, tubular expansion and compression and sheet metal forming. These processes done by the electromagnetic pulse forming machine are utilized in many of the world's major industries such as the electrical industry, automotive industry, defense industry, aerospace industry and the nuclear industry. However these industries utilize conventional processes to build components which sometimes result in lower quality products and slow forming resulting in huge time wastage in making a single component.

<b>Project Title:</b>	<b>Gantry Crane</b>
<b>Students:</b>	Shahneel Fatima(15-EE-11) Nasir Abbas (15-EE-59) Shahzaib Jaffery(15-EE-162) Pakiza Naeem(15-EE-186)
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<b>Abstract:</b>	<p>Automation and control are important aspects of modern manufacturing and utility supply. Our project focuses on the design and development of Gantry Crane that transports payload to the required position with precision as fast as possible without causing any excessive movement at the final position and reduces the time.</p> <p>The objective of this project is to come up with a control system design to automate the crane system in order to achieve its operating goals and to reduce the manpower as much as possible. When input signal is applied to a crane system, the trolley while handling the payload using jaw will start to move towards the desired location, the controller applied is Arduino Nano. Arduino Nano has been chosen because of its ability to work efficiently and accurately. The prototype developed has been controlled in real time through MATLAB. The effectiveness of the controller has been investigated in terms of time response, percentage of overshoot, payload sway.</p>

<b>Project Title:</b>	<b>Intelligent Distributed Autonomous Power system (IDAPS)</b>
<b>Students:</b>	Munawar Hussain(15-EE-47) Ahmad Raza(15-EE-111) Bilal Ahmad (15-EE-183) Irfan Hussain(15-EE-191)
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<b>Abstract:</b>	<p>Despite the rapid growing Distributed Energy resources, there is no yet established mechanism to coordinate these “customer owned resources” to serve critical load at distribution level. Further, Integration of REs to conventional electricity grid is very difficult due to serious frequency fluctuation as a result of frequent loss of generation &amp; it is further compounded by reverse power flow that may occur in the conventional grid designed to allow power flow only in one direction. The Intelligent Distributed Autonomous Power System (IDAPS) includes: -</p> <ul style="list-style-type: none"> <li>➤ Two-way flow of electricity and information to create automated distributed energy Delivery system.</li> <li>➤ Reducing the cost and peak demand of electricity by customers adjusting their consumption to more convenient time for the grid based on cost and power production information available.</li> <li>➤ Coordination of rapid growing DERs to secure critical load.</li> </ul>

<b>Project Title:</b>	<b>Automation of Railway Tracks</b>
<b>Students:</b>	Amna Mumtaz (15-EE-15) Sidra Amin (15-EE-87) Arslan Arshad (15-EE-139) Asad Abbas Jaffery (15-EE-147)
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<b>Abstract:</b>	<p>The main purpose of this study is to design a system for switching of Railway Tracks using modern communication techniques. The need for automation and optimization is most in Pakistan. Our project idea is to track the ongoing train with the help of wireless system technology, record the data in center and change the track positions as required. In such a way, tracks are to be adjusted such that the already delayed train will be given priority to ensure the train is on time. The data processing will be done using Arduino to save the cost. Wireless sensor system will be used for communication among different part of system communication- the base system known as Master Terminal Unit (MTU) and the remote terminal unit. This system will be helpful in reduction of delays and accidents, less man-labor, smart monitoring of train system, optimized railway operation.</p>

<b>Project Title:</b>	<b>Smart Power Generation using Dual-Axis solar tracker.</b>
<b>Students:</b>	M. Farooq (15-EE-123) Mohsin bashir (15-EE-75) Mohsin Riaz (15-EE-163) Taimoor Nawaz (15-EE-31)
<b>Supervisor:</b>	Engr. Umer Imtiaz, Lecturer
<b>Email:</b>	<a href="mailto:Umer.imtiaz@uettaxila.edu.pk">Umer.imtiaz@uettaxila.edu.pk</a>
<b>Abstract:</b>	<p>This project is all about generating electricity by solar energy. Solar energy is rapidly gaining notoriety as an important means of expanding renewable energy resources. As such, it is vital that those in engineering fields understand the technologies associated with this area. Our project will include the design and construction of a microcontroller-based solar panel tracking system. Solar tracking allows more energy to be produced because the solar array is able to remain aligned to the sun. In our project we designed a Dual-axis solar tracker. The tracker actively tracks the sun and changes its position accordingly to maximize the power output. Two geared window motors are used to move the solar panel so that sun's beam is able to remain aligned with the solar panel.</p>

<b>Project Title:</b>	<b>Three Stage Lead Acid Battery Charging and Management system.</b>
<b>Students:</b>	M.Haider Ali(15-EE-51) Yameena Tahir(15-EE-23) Shaiza (15-EE-35) Syed Mujtaba Tahir(15-EE-154)
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<b>Abstract:</b>	<p>Uncontrolled battery charging leads to premature battery failure. This results in decreased battery life and battery performance. Undercharging of battery may leads to sulfation problem in lead acid battery whereas overcharging may cause gassing problem in battery. This project is about the design of Battery Management System (BMS) for improved performance &amp; life of the lead acid battery. Three stage battery management system is be implemented which includes constant current followed by constant voltage &amp; finally battery is kept at floating voltage. A Switched mode power supply (SMPS) is designed for a three-stage battery charger. Switch Mode Power Supplies/chargers work on very high frequencies as compared to linear power supplies and as the size of transformer reduces with increase in frequency, the overall size of SMPS becomes very small as compared to linear power supplies. As the size of transformer reduces. Also, a smaller number of turns required for secondary of ferrite core transformer. So overall, copper losses decrease and as well as core losses decreases due to ferrite core. Efficiency of SMPS is 60-70% as compared to linear power supplies with efficiency 30-40% only. For a well-designed SMPS, even 95% efficiency can be achieved.</p>

<b>Project Title:</b>	<b>Home Energy Management System (HEMS)</b>
<b>Students:</b>	Laiba Ashiq (15-EE-03) Sameer Awais (15-EE-91) Rabbiya Gull (15-EE-115) Rizwana Tabassum (15-EE-151)
<b>Supervisor:</b>	Engr. Nouman Qamar, Lecturer
<b>Email:</b>	<a href="mailto:nouman.qamar@uettaxila.edu.pk">nouman.qamar@uettaxila.edu.pk</a>
<b>Abstract:</b>	<p>This purpose of this study is to implement a mathematical model for the optimal scheduling of appliance based on the concept of time of use tariff. This model is implemented on a house where the power consumption of each appliance is known, and appliances are shifted in 24 hours slots where each slot is of 60 min. The purpose of shifting is to minimize the cost and bills on the consumer end only based on the concept of demand side response without disturbing the comfort of consumer. Our system enables the consumer to calculate his electricity bills on the consumer end only as cost and energy consumption of each period/slot is shown on the LCD connected.</p>

<b>Project Title:</b>	<b>Smart Monitoring and Protection of Distribution Transformer</b>
<b>Students:</b>	Hassan Jamal (15-EE-127) Hassan Shahid((15-EE-67) Syed Najeeb Ali Kazmi(15-EE-63) Muhammad Huzaifa(15-EE-55)
<b>Supervisor:</b>	Dr. Faisal Nadeem Khan, Assistant Professor
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<b>Abstract:</b>	In modern era, many industries including power industry are shifting towards IoT based automation to reduce errors, increase efficiency and to enable remote controlling and monitoring. Distribution trans-formers are the vital component of the power network for continuous power supply to utilities. As distribution transformers (DTs) are usually affected due to overloading, overheating, symmetric & non-symmetric faults and oil hydration. Therefore, our project that is designed as trainer module for UET Taxila uses IoT technology for online monitoring and fault protection of distribution transformer. The designed trainer allows learners to perform and understand the Internet of Things based fault analysis, monitoring, protection and remote controlling using Blank mobile app.



<b>Project Title:</b>	<b>Plug and play devices for load management in smart homes</b>
<b>Students:</b>	Muhammad Sajjad (15-EE-27) Ahmed Aslam Bhutta (15-EE-43) Shahzad Hassan Zafar (15-EE-71) Bilal Aslam (15-EE-83)
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<b>Abstract:</b>	<p>In this era, world is advancing towards smartness. The designed product is smart in electrical domain. Smart plugs are used in smart grids to monitor and control the load of consumer by the utility. Smart plugs play a fundamental role in using the power efficiently by the load management. Our smart plug recognizes the load connected with it and monitor its consumed power. It can perform switching and controlling through web-based application. Smart plug sends the desired data to the server with the help of Wi-Fi. Smart plug stores data in SD card of consumed power of user with date and time. This data is used to plot load curve and for future planning. Load management is performed by the server operator. This device plays a key role in load management and smartness of household appliances.</p> <p>Keywords: load management, switching.</p>

<b>Project Title:</b>	<b>Design and Fabrication of Dynamic Load Balancing and Reactive Power Compensation</b>
<b>Students:</b>	Akash Arif (15-EE-39) Abdur Rafy(15-EE-103) Shahzain Inam (15-EE-159) Asad Rizwan (15-EE-170)
<b>Supervisor</b>	Engr. Usama Ashfaq, Lecturer
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<b>Abstract</b>	The project mainly tends to develop a new methodology which dynamically balance the load on three phases and compensate reactive power. Otherwise these reactive power components of load current cause low power factor, low efficiency and poor utilization of the distribution system. When the load unbalance on power distribution network (PDN), a controller shifts the load on other phase and make the system dynamically balanced. Additionally, the project tends to improve the power factor through the use of the power factor meter relay. Our topic is concerned to restrain the three-phase system balance and compensation of reactive power to reduce power losses and to avoid the damaging of electric equipment and fulfills the power requirements. In this way every user has opportunity to connect any phase. The system efficiency is enhancing.

<b>Project Title:</b>	<b>Design &amp; Implementation of Traction for Electric Vehicle</b>
<b>Students:</b>	Umar Waleed(15-EE-52) Muhammad Usman(15-EE-124) Rana Sheraz(15-EE-148) Tehzeeb-ul-hussnain(15-EE-184)
<b>Supervisor:</b>	Engr. Hammad Shaukat, Lecture
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<b>Abstract:</b>	<p>Due to growing energy crisis engineers all over the world are burning midnight oil to develop such efficient systems to cater the need of energy produced by conventional system such as fuel, gas, etc. that are cost inefficient. Designing vehicles based on sustainable energy sources is one of the topics of interest all over the world now a day. The key to accelerate the world's transition to sustainable energy. the more rapidly the world stops depending upon fossil fuels and moves towards a zero-emission future i.e. green future, the better will be the future of growing economic world. In the nutshell the very project solely relies on designing of adjustable voltage frequency drive for the traction system which in turn control the speed mechanism of 3 induction motor. Apart from this VFD's are heart of various control mechanisms in industries and are responsible for more 65% power consumption. Energy consumption in our facility can be reduced by as much as 70% by optimizing motor control using VFD's.</p>

<b>Project Title:</b>	<b>Smart Classroom</b>
<b>Students:</b>	Mahrukh Ijaz(15-EE-044) Hamna Ameer(15-EE-060) Ali Ijaz(15-EE-144) Shoaib Hassan(15-EE-176)
<b>Supervisor:</b>	Eng. Hammad Shaukat, Lecturer
<b>Email:</b>	hammad.shaukat@uettaxila.edu.pk
<b>Abstract:</b>	<p>Increasing demand for fuel vehicles, increasing carbon emissions and rising cost of fuels are forcing everyone to seek for development of energy efficient systems. That's why world is diverting toward Battery operated/electric vehicles (EV's). But we also have to save electric energy as our country is currently in a circular debt and we should save energy as much as we can. This led developments in regenerative braking systems market. This project will recover 5% to 20% of transmitted energy by using regenerative braking systems. It is physical phenomenon of conservation of energy. When brakes will be applied to a moving motor it will be used as a generator to regenerate electrical power from mechanical energy due to inertia. This energy can also be stored as electricity and then returned to the drive vehicles during acceleration or whenever required.</p>

<b>Project Title:</b>	<b>Intelligent Class-room Behavioral Management System using machine learning</b>
<b>Students:</b>	Sheikh Arslan Jamil (15-EE-40) Afzaal Arirf (15-EE-56) M Asadullah Qazi (15-EE-80) Nouman Saeed (15-EE-104)
<b>Supervisor:</b>	Dr. Sarmad Sohaib, Assistant Professor EED
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<b>Abstract:</b>	In recent years, human behavior detection has sought profound attention for the establishment of smart video surveillance systems. These systems not only recognize faces but also detect facial expressions for the analysis of human behavior. The system uses machine learning algorithms applied on facial feature points for behavior recognition. Our project proffers a video surveillance system for a classroom that discerns the behavior for the appraisal of students as well as the education system. The project acquires images from a camera for behavior analysis. An attached Raspberry-pi captures image every 30 seconds and executes a python script for marking attendance, analyzing behavior of respective students and for recording results in a student database accessible to only an authorized faculty member. The project has applications in the education department, offices and can also be used to revolutionize CCTV for detecting and taking counter measures against criminal activities.

<b>Project Title:</b>	<b>Smart High Voltage Measurement System</b>
<b>Students:</b>	Zaeem Islam (15-EE-24) Waqas Naseem (15-EE-48) Usama Mustafa (15-EE-128) Hamza Niaz (15-EE-136)
<b>Supervisor:</b>	Dr. Salman Amin, Associate Professor
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<b>Abstract:</b>	<p>High Voltage is commonly defined as the voltage higher than that used for power distribution. Our SDP area concerns both high voltage &amp; measurement.</p> <p>High Voltage Measurement is a complex engineering problem due to handling &amp; safety concerns, so we plan to fabricate a smart instrument that will be able to measure high voltages.</p> <p>The hardware of SDP comprises of a series of high voltage resistors that'll be playing the role of resistor-divider in our circuit. The supply will be given via a known source &amp; resistors will drop the voltage from values as high as 500kV to a range of 0-5V that'll be sufficient &amp; optimum for the operation of Arduino. In the end, we will calibrate this minimized voltage.</p> <p>In our labs, we have known sources of high voltage. So, our SDP can be validated by <b>testing</b> the sources &amp; comparing the results with the known values.</p>

<b>Project Title:</b>	<b>GSM and IOT Based Power Theft Detection System</b>
<b>Students:</b>	M. Talha Shah Ch. (15-EE-20)
<b>Supervisor:</b>	Dr.Tahir Nadeem Malik, Professor
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<b>Abstract:</b>	<p>This research basically developed a device that will detect a power theft on the service main line. This device operates on a 230V, Single Phase supply and is equipped with Arduino Uno and other important equipment which will distinguish illegal connection. The device compares the current in the pole side and the consumer side which is accomplished through a current sensor placed on both ends of the service line conductor. The research also based on the wireless technology which uses GSM and Wi-Fi module in order to send the power theft alert message the consumer as well to the Electricity supply authority which can monitor the sensor value in real time respectively and consumer also has a access to check their status online whenever he or she wants.</p>

<b>Project Title:</b>	<b>Wi-Fi Based Home Automation</b>
<b>Students:</b>	Muaz Hamayun (15-EE-12) Fahad Nisar (15-EE-36) Arbaz Zafar (15-EE-140) Saad Usman (15-EE-164)
<b>Supervisor:</b>	Dr. Inamul Hassan Shaikh, Assistant Professor
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<b>Abstract:</b>	Home appliances can be controlled using your smartphones, laptops, handhelds no matter where you are. Main objective is to optimize cost and time management. Less or optimized use of energy resources also helps in overcoming the energy crisis. Different modules have been designed to meet specific market needs having ability to control up to 5 appliances per module. Internet connectivity is not necessary if you are in the local network where the module is installed. To control outside the local network internet is required. Modules have different functions like manual switches, timers, scheduled on/off. These functions are controlled using the android app or the Web based control panel, both of which are multi-lingual to cover major segments of the market.



<b>Project Title:</b>	<b>Maximum Power Point Tracking of Solar Panel</b>
<b>Students:</b>	Hamna Tariq (15-EE-04) Mahnoor Khalid (15-EE-08) Shoaib Sabir (15-EE-32) Haris Ali (15-EE-72)
<b>Supervisor:</b>	Engr. Hammad Shaukat, Lecturer
<b>Email:</b>	<a href="mailto:Hammad.shaukat@uettaxila.edu.pk">Hammad.shaukat@uettaxila.edu.pk</a>
<b>Abstract:</b>	<p>Keeping in view the demand of energy and environmental threats, the solution is renewable energy resources. With the shortage of nonrenewable resources nowadays to generate power, researchers are rapidly moving towards renewable resources. Solar cells are used to convert solar energy into electrical energy. Solar power technology is in use for decades but the problem is solar panels are not mostly operated at their maximum potential. The intention of this project is to extract maximum power from solar cells using maximum Power Point Tracking (MPPT). This project investigates in detail the concept of MPPT which significantly increases the efficiency of the solar system. Perturb and observe (P&amp;O) is one of many MPPT techniques. The MPPT system is implemented in the control circuit of a DC–DC converter. The simulation study is done using LT spice simulation software. The results of the MPPT scheme is compared with existing results of certified research papers.</p>

<b>Project Title:</b>	<b>A Neural Network Based Brain Computer Interface for Classification of Movement Related EEG</b>
<b>Students:</b>	Ibrahim Manzoor (15-EE-017) Khaleeq Tajammal(15-EE-049) Sidra Iqbal(15-EE-112) Asmad Razzaq (15-EE-152)
<b>Supervisor:</b>	Dr. Sarmad Sohaib, Associate Professor
<b>Email:</b>	<a href="mailto:Hammad.shaukat@uettaxila.edu.pk">Hammad.shaukat@uettaxila.edu.pk</a>
<b>Abstract:</b>	Our senior design project revolves around the interfacing of Human Brain with Computer using the EEG signal generated in Brain due to neurons activity. The project's main phases include signal acquisition and classification techniques. By the aid of Machine Learning we classified EEG signals and made out some useful content that enabled us to control the movement of vehicle in various directions. The aim of doing this project is to make an automated car using brain that would do the service effectively and efficiently. The methodology started with signal acquisition where the signals with noise were filtered through preprocessing techniques and after that applying machine learning through python, we classified them, extracted some feature out of them and made vehicle driven by the processed data. The success of our project lies in the fact that how efficiently we collected and trained data for a controlled vehicle movement.

<b>Project Title:</b>	<b>Prediction of Properties of Materials through Image processing and Machine learning</b>
<b>Students:</b>	Imran Khan(15-EE-46)
<b>Supervisor:</b>	Dr. Junaid Mir
<b>Email:</b>	<a href="mailto:junaidmir14@gmail.com">junaidmir14@gmail.com</a>
<b>Abstract:</b>	<p>The image processing has been extensively used to examine the surface of materials by capturing them in form of an image and extracting the required features. It is an inexpensive, non-destructive and contact-less approach. Different images were obtained through camera and various techniques on image were applied to extract the required information for desired purpose. The extracted features were standard deviation, median and mean. The extracted information was given as input to machine learning technique to obtain the compressive strength and tensile strength of concrete blocks. Homogeneity of blocks was determined using image segmentation technique. Technique used for homogeneity was thresholding. Results obtained through proposed design were verified through experimental values.</p>

<b>Project Title:</b>	<b>Hand Gesture Controlled Robot</b>
<b>Students:</b>	Komal Javed (15-EE-06) Yamna Yameen Rafi (15-EE-10) Zaira Zia (15-EE-22) Ayesha Azhar (15-EE-118)
<b>Supervisor:</b>	Engr. Hammad Haider, Lecturer
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<b>Abstract:</b>	<p>Robotics is an emerging field in the world of control and automation. Robots are gaining much importance in industrial automation due to high profitability. Our project is based on designing of hand gesture robot. Human robot interaction is done through flex sensors used on glove which sense the bends of fingers and communication is done via Xbee modules.</p> <p>We have designed four gestures that can either move robotic car in four directions (forward, backward, right and left) or the robotic arm (up, down, open and close) one at a time using the push button as a selector switch. We have just made a prototype and worked at a very small level, but the basic idea will still remain the same whether controlling a small toy car or a heavy machinery and we can achieve it by changing motors, controller and adding more features like obstacle avoidance, speed controlling etc. The glove part will remain the same for controlling any machine.</p>

<b>Project Title:</b>	<b>Design and fabrication of Segway with improved control design</b>
<b>Students:</b>	Sarmad Noor (15-EE-53) Osama Naeem (15-EE-149) Mohsin(15-EE-165) Osama Ahmad (15-EE-173)
<b>Supervisor:</b>	Ing. Ahsan Ali
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<b>Abstract:</b>	<p>Segway is a two-wheeled, personal electric transporter used as a convenient way to travel around towns and cities. It is a self-balancing device and its name is derived from the word "segue" which literally means "follows". The motorized scooter uses gyroscopes to remain upright and is controlled by the direction in which the rider leans. Riders lean backwards, forwards for acceleration and to the left and right using a thin handlebar attached to a pole for steering the Segway. The Segway has a top speed of around 12.5 mph and is often used by workers in warehouses and on industrial sites. It is promoted as the "greenest" way to travel.</p> <p>Air pollution, a sustained increase in the average temperature of the earth and the need for efficient, green energy powered vehicles that can also be utilized in the project of Smart City concept. Being the "Greenest" way to travel, Segway provides a fast and convenient method to everyone to travel around in industries, institutions and other working places.</p>

<b>Project Title:</b>	<b>Home Energy Management System (HEMS)</b>
<b>Students:</b>	Laiba Ashiq (15-EE-03) Sameer Awais (15-EE-91) Rabbiya Gull (15-EE-115) Rizwana Tabassum (15-EE-151)
<b>Supervisor:</b>	Engr. Nouman Qamar, Lecturer
<b>Email:</b>	<a href="mailto:nouman.qamar@uettaxila.edu.pk">nouman.qamar@uettaxila.edu.pk</a>
<b>Abstract:</b>	<p>This purpose of this study is to implement a mathematical model for the optimal scheduling of appliance based on the concept of time of use tariff. This model is implemented on a house where the power consumption of each appliance is known, and appliances are shifted in 24 hours slots where each slot is of 60 min. The purpose of shifting is to minimize the cost and bills on the consumer end only based on the concept of demand side response without disturbing the comfort of consumer. Our system enables the consumer to calculate his electricity bills on the consumer end only as cost and energy consumption of each period/slot is shown on the LCD connected. This mathematical model has saved and reduced the bills up to 63 rupees for same amount of energy consumed before and after Home Energy Management System.</p>

<b>Project Title:</b>	<b>Detection of Hostile Firing through Acoustic Based System in Constrained Environment</b>
<b>Students:</b>	Muhammad Salman Kabir (15-EE-002) Sabir Shehzad (15-EE-058) Malik Touseef Ahmad (15-EE-134)
<b>Supervisor:</b>	Dr. Junaid Mir, Assistant Professor
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<b>Abstract:</b>	<p>Pakistan being the victim of terrorism needs a strong response system with an efficient use of technology to minimize its aftereffects. In most cases of terrorism, VIP target killings contributes a lot towards security instability in the country.</p> <p>In such situation, a defensive mechanism which will not only assist our security agencies to protect meaningful life but also aid our armed forces to maximize its missions ‘success rate will be quite beneficial.</p> <p>“Detection of Hostile Firing through Acoustic Based System in Constrained Environment” is a robust and cost effective acoustic based gunshot detection and localization system, relies on state – of – art signal processing techniques, capable to detect and localize shooter under harsh environments. Accompanied with remote weapon station.</p> <p>The designed system has following specification:</p> <ol style="list-style-type: none"> <li>1. 5 Seconds – Response Time</li> <li>2. 360<sup>0</sup> × 180<sup>0</sup> Surveillance</li> <li>3. Fully Automated Operation</li> </ol>

<b>Project Title:</b>	<b>Smart Home Using GSM &amp; WiFi Technology</b>
<b>Students:</b>	Rana Ahsan Mumtaz (15-EE-76), Muhammad Idrees (15-EE-88), Falak Sher (15-EE-96) & Taymor Anwar (15-EE-120)
<b>Supervisor:</b>	Dr.Tahir Nadeem Malik, Dean of Electrical Engineering Department
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<b>Abstract:</b>	<p>In this proposed project, the work is carried out to design and prototype implementation of a wireless real-time home automation that uses today's most acceptable technologies all over the world that is GSM and Wi-Fi as a network infrastructure. This home automation system consists of two main concepts; the first is the server, which presents system core that manages, controls, and monitors users' home appliances. Second is the serial communication between GSM modem and microcontroller which is acting as server as well. Server continuously looks for either the user's request is coming from GSM i.e. SMS from mobile phones or from Wi-Fi to turn ON/OFF the household devices and performs duty accordingly. For this purpose, an android based application is developed to make it user friendly using MIT App Inventor which is a latest visual-interface programming platform for developing mobile applications for Android-based smart phones. The most attractive and interesting thing about this system is that it sends the confirmatory SMS to user's mobile phone after switching ON/OFF the corresponding device.</p>