NEWSLETTER

ELECTRICAL AND COMPUTER ENGINEERING

2020

LIST OF EVENTS

- Departmental Seminars
- Departmental Online Webinars
- Departmental Internships
- Research Activities
- Rector Visit
- Launching New MS and PHD Programs
- COVID-19 Outbreak
- Establishment and training for power transmission lab
- Faculty Rejoining/Hiring/ Transferred

ESTABLISHMENT OF POWER TRANSMISSION LAB

Pakistan Engineering Council has granted a permission to start Electrical Power Engineering Program under ECE Department, CUI Lahore. Therefore, subject to the establishment of its labs, CUI Lahore has newly established Power transmission lab in the department.

COVID-19 OUTBREAK

Due to prevailing situation of corona virus in Pakistan, all educational institute in are shifted to asynchronous online system from conventional physical teaching system. In Electrical and Computer Engineering department of CUI, several committees were established at departmental level to figure out strategies and operating procedure for smooth and effective conduction of classes and labs.
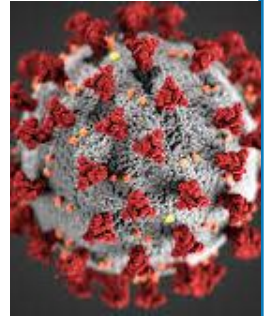
LAUNCHING OF MS AND PHD PROGRAMS

- PhD program in Computer Engineering
- MS program in Computer Engineering
- MS in Power and Sustainable Energy Systems
- MS Program in Renewable Energy

MESSAGE FROM DIRECTOR

I welcome you on behalf of the faculty and staff. These are exciting times for electrical and computer engineers as the discipline is now widely recognized as an essential source of tools and techniques for advancements in nearly all spheres of human endeavor. Our students get competitive skills in effective development and application of modern technology. We see our students as excellent engineers, outstanding researchers, extra ordinary analysts, and innovative designers. We are aware of everyday breakthroughs in modern technology and committed to equip our students with advanced competencies required to manage the growing needs of sciences and technology; in almost every professional field today. Research activities have been given high priority within the department resulting in a high quality of research publications. The Department of Electrical and Computer Engineering offers competitive degrees in rapidly expanding areas of study. Our qualified faculty and excellent facilities ensure that students have a solid technical grasp on different subjects to apply this knowledge in practical work settings. Our prolific linkages with the Higher Education Commission, Ministry of Science and Technology and leading universities of the world help us keep up-to-date with new policy initiatives and market driven incentives being unrolled by the government and private sectors.

Prof. Dr. Syed Asad Hussain

Director CUI, Lahore

MESSAGE FROM HEAD OF ACADEMICS & RESEARCH

In the modern era of globalization and continuous struggle for excellence, the department of Electrical and Computer Engineering has built itself with a marked difference in quality. It is certainly a matter of pride that this department has produced a sparkling community of engineers, where faculty and students are cronies in a mutually inspirational education process to achieve learning objectives of inventions and skill development.

The degree programs in electrical and computer engineering are carefully designed, updated and implemented with the objective to provide the students with a solid foundation for their professional life. Developments are taking place in almost all branches of engineering and sciences. These developments have substantial impact on the research output in computer and electrical engineering. It is satisfying that the faculty and students of ECE are well-versed with these developments and are carving their path steadily towards excellence despite the uncertainties of COVID-19. The department is well connected with the industry through Industrial Advisory Board and**Collaboration & Outreach Committee (COC),**and have managed to produce excellent research by securing funding from Higher Education Commission and other funding agencies.

I am delighted that the Department of ECE has successfully managed to produce Newsletter despite many limitations and odds. This shows the determination and hard work of the faculty and students of the department. I hope this Newsletter will remain an active medium for the students and faculty to show their hidden talent and have their creativity and contributions recognized. As Head of Academics & Research, and as a focal person for ORIC, I and my staff are always ready to guide, streamline and facilitate the students and faculty in their academic, research and extra-curricular affairs.

Prof. Dr. Muhammad Ahmed Farooqui

Head, Academics and Research
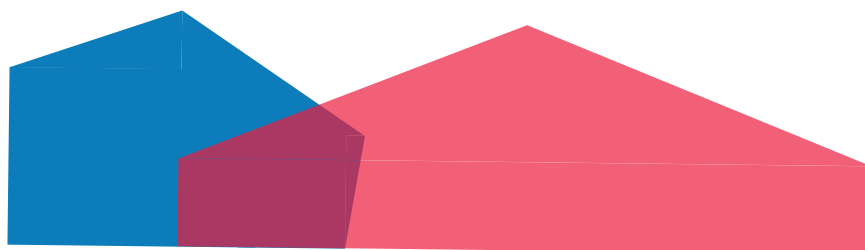
MESSAGE FROM HEAD OF DEPARTMENT

I feel honored to lead the Department of Electrical and Computer Engineering (ECE) as Head and welcome all newly admitted students in various programs of the department at both undergraduate and graduate levels in Fall 20 and SP 21 semesters. Electrical and Computer Engineering (ECE) is one of the largest departments of COMSATS University Islamabad (CUI), Lahore Campus and occupies a central place in major activities at the campus. We are striving to achieve this objective by imparting rigorous and quality education to our stellar students and engaging our faculty and research groups in the cutting edge fields of the research.The degree programs offered at the department have a balanced mix of theory and practical work in the laboratories. The theory courses are taught by our excellent, highly qualified and trained faculty. For the practical work, the department has a number of laboratories with the services of dedicated Lab Engineers which are fully equipped with modern and state of the art tools needed by the undergraduate and graduate students to learn, practice and enhance their practical skills towards engineering education. All the degree programs currently being offered both at undergraduate and graduate levels are recognized by the Higher Education Commission (HEC), Islamabad Pakistan and Pakistan Engineering Council (PEC), Islamabad.

Our graduate students currently enrolled in Master's and PhD degree programs are very much involved in carrying out research activities with these research groups under the guidance of their research Supervisor towards pursue of their degrees. Our students and faculty are fully committed in making all the possible efforts to play the due role in minimizing the adverse effects of the global Corona-virus pandemic and bring to the forefront new technologies and pedagogies to achieve our goals.

I would like to assure the parents of our students that Department will take all possible steps to ensure the safety and well being of our students currently enrolled at our various programs. We (the faculty) are also deeply committed to inculcate in our graduates the essential skills and professional talent that helps them to meet the needs of the fourth industrial revolution as well as impart industry and market relevant education which may bring laurels to their adopted future careers.

In conclusion, please join us on our exciting journey into realizing your highest potential towards becoming academic leaders in Pakistan and South-East Asia .

I pray to Almighty Allah (SWT) for assistance in our future endeavors and look forward towards glorious achievements in the times to come with our team work efforts.

Engr. Dr. Ejaz A. Ansari

Head of the Department

SEMINAR DETAILS

- Dr. Sobia Baig, Associate Professor attended the IUPEX-Inter University Project Exhibition 2020 as a Judge on Thursday, 30th January, 2020 organized by the Department of Electrical Engineering at GC University, Lahore.

- Dr. Mirza Tariq Hamayun, Assistant Professor (ECE) attended a Symposium on Control Automation and Intelligence as a keynote speaker organized by University of Lahore (UoL), Lahore on Saturday, 15th February, 2020. Dr. Tariq represented the ECE Department, CUI Lahore Campus and gave a talk on "*Integral Sliding Mode as a Tool for Fault Tolerant Control*".

- Dr. Sobia Baig, Associate Professor/Vice-Chair IEEE Lahore Section represented COMSATS University Islamabad and IEEE Lahore Section at the inauguration of **International Conference of Emerging Technologies (ICEET)** on Saturday, 22nd February, 2020 at Superior University, Lahore. She participated in a Panel Discussion along with Chair IEEE Lahore Section, representatives from TEVTA, PEC and PIEAS.

DEPARTMENTAL SEMINARS/CPD

- Dr. Sobia Baig, Associate Professor/Vice-Chair IEEE Lahore Section delivered a keynote address on "*Emerging Technology Trends in Wireless Communication for 5G and Beyond*" at the **International Conference of Emerging Technologies (ICEET)** on Sunday, 23rd February, 2020 at Superior University, Lahore.

SEMINAR DETAILS

- A CPD workshop on "*PV Solar Renewable Power Systems*" was conducted by Continuing Professional Development (CPD) Committee on Wednesday, 4thMarch, 2020, wherein, 54 participants attended the workshop. Dr. Fawad Azeem, Lecturer, Energy Research Center (ERC) and a guest speaker Mr. Muhammad Zubair, Design Engineer, Sky Electric Pvt. Ltd. conducted the sessions and shared their experiences on the topic.

- Collaboration Outreach Committee (COC) conducted a seminar on "*Final Year Project*" on Thursday, 5th March, 2020, wherein, Dr. Muhammad Farooq-i-Azam, Assistant Professor delivered a talk on the topic.

- Dr. Sobia Baig, Associate Professor/Vice-Chair & Conference Chair, IEEE Lahore Section/Counselor CUI-IEEE Student Branch, Lahore attended IEEE Lahore Section's Annual General Meeting (AGM) 2020 as an organizer on Saturday, 1st February, 2020 at Lahore Garrison University, Lahore.

## DEPARTMENTAL SEMINARS/CPD ...

DEPARTMENTAL WEBINARS

CAREER COUNSELING AND SKILL DEVELOPMENT

- A webinar on "career counselling and skill development for Electrical engineer" was arranged on Friday, May 29,2020 by SEDC Studio Institute of Southern Punjab in which Engr. Dr M Yaqoob was invited as a guest speaker. In the webinar the speaker addressed the issues and queries of electrical engineering students and guided them how to pursue their career.
- The speaker discussed in detail about various career options for Engineering students in Information technology, Electrical, Mechanical, Civil and Chemical fields along with entry level jobs, skills required for entry level jobs, engineering salaries, higher education courses etc.

ENTREPRENEURSHIP OPPORTUNITIES IN ELECTRICAL ENGINEERING

Another webinar on a very important topic was entrepreneurship opportunities in Electrical Engineering. There are a lot of studies on the topic of entrepreneurship. The talk consisted of that why entrepreneurship develops at a faster rate in underdeveloped countries as compared to developed countries. The importance of entrepreneurship for our country and opportunities for electrical engineers for developing products for marketing.
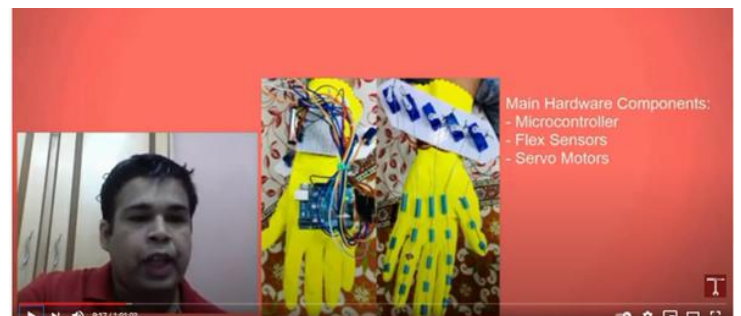

FINAL YEAR PROJECT IDEAS

A webinar on "final year projects ideas for engineering students" covered an informative session on different project ideas that can help students to finalize their Final Year Projects of different engineering domains. This session was hosted by Dr. Tahir Rizvi and Dr. Yaqoob Javed.

HOW TO IMPLEMENT FYP

A webinar on "How to implement FYP" was conducted for the students of electrical engineer keeping. Dr SyedTahir Hussain Rizvi discussed in detail about the criteria of selection of FYP and the fields available for final year projects. In the end Dr. Yaqoob explained the requirements of FYP reports and its breakdown into chapters.

DEPARTMENTAL INTERNSHIPS
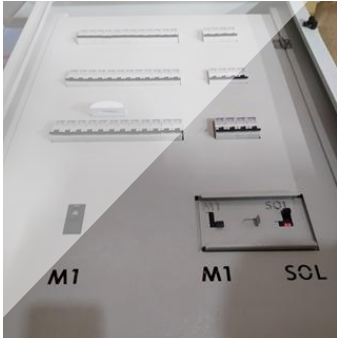
TRANSFOPOWER INDUSTRIES

The Internship was conducted from dated 22-07-2020 to 10-08-2020. Around 80 students participated as an internee. The basic topics covered were Transformers basics, Enamel copper wire testing, Limitations and differences of generations of communication in reference to smart metering infrastructure, Names of all transformers manufacturing companies and which type of transformers these companies are manufacturing, Methods of making a transformer winding, Difference between Dry and Oil transformers, Difference between SCADA and DCS systems, Detail of silicon steel sheet, Explain transformers construction, Net metering in Pakistan.

PEL INTERNSHIP

During 4 Weeks of virtual internship program (VIP) from dated 20th July to 17th August, 2020, 1 student was placed in Engineering Procurement and Construction (EPC) department and 3 students were placed in Marketing and Private sales department. Where they learned the designing, procurement and construction related to a 132kV grid station project of PEL for MEPCO. Different designing and construction aspects were taught using AutoCAD diagrams of general layout, foundation layout, earthing layout, switchyard layout and sections, single line diagram as primary design. In secondary design, students were taught about different components such as circuit breakers, relays, isolators and, bus bars using AutoCAD diagrams. An overview of different types of protection was also a part of the program. The last week was about the marketing and tendering. A report on "Life Cycle of a Sub-Station" transformers, energy meters and their types, LV and HV switchgears and their testing principles, bus bars

AL-REHMAN SWITCHGEAR INTERNSHIP

At Al Rehman Switchgears ,The students worked on different protection panels, distribution boxes and ATS (automatic transfer switches) panels. and also worked on different motor starters i.e. Star-Delta and DoL (Direct on Line).

We learned about synchronization panels, PFI plants and bus bars. The students also worked on BTD (bus tie duct) or busway.

Internship duration was almost two weeks i.e. from 25thAugust 2020 to 10thSeptember 2020.

and their types, circuit breakers and their charging methods and, types of relays. A report on "Identification of Shortcomings in Generation, Transmission and Distribution" was used to evaluate the students' understanding of the VIP.

FUNDED PROJECTS

- A project was submitted for NRPU-HEC (National Research Program for Universities-Higher Education Commission).
- Nine projects were submitted for NRPU-HEC (National Research Program for Universities-Higher Education Commission) by the ECE Faculty Members.
- A Final Year Project (FYP) titled "**Vehicle Tracking and Security with E-call Standard Framework**" supervised by Mian Ahmed Yaser, Assistant Professor (ECE) of undergraduate program was shortlisted for NGIRI Championship 2019 was held on Thursday, 13thFebruary, 2020 at Islamabad. (13th- 17thJan 2020)
- Following two Final Year Projects (FYPs) of students of undergraduate programs participated in "16th Pakistan International Auto Show 2020" on Friday-Sunday, 21st to 23rd February, 2020 arranged by Pakistan Association of Automotive Parts & Accessories Manufacturers at Expo Center, Lahore: -
  - Rear Wheel Rooted Hybrid Bike
  - Solar Powered Three-Dimensional Mapping and Dimensional Parameter Computer for Distance Calculations and Cloning Architecture using LIDAR

PUBLICATIONS

- ZhaoxiaDuan, **Imran Ghous**, Yuanqing Xia, Jahanzeb Akhtar, H∞ Control Problem of Discrete 2-D Switched Mixed Delayed Systems Using the Improved Lyapunov-Krasovskii Functional, International Journal of Control, Automation and Systems. 2020 Aug;18(8):2075-87 (impact factor 2.733)

- **Imran Ghous**, Jian Lu, Waqas Hussain, Observer-based H∞ control for discrete-time one-sided Lipschitz Markovian jump delayed systems under partially unknown transition probabilities, Journal of the Franklin Institute, 2020 Sep 1;357(13):8611-30.(impact factor 4.036)

- Jinna Fu, ZhaoxiaDuan, **Imran Ghous**, ℓ1-induced norm and controller synthesis for positive 2D systems with multiple delays, Journal of the Franklin Institute.2020 Aug 1;357(12):7904-20.(impact factor 4.036)

- **Imran Ghous**, Jian Lu, Robust Observer Design for Two-dimensional Discrete Positive Switched Systems with Delays, IEEE Transactions on Circuits and Systems II: Express Briefs, 2020 Apr 9.(impact factor 2.814)

- **K. Ali**, M. Tahir, Maximum Likelihood Based Robust State Estimation Over a Horizon Length during Measurement Outliers, Transactions of the Institute of Measurement and Control, 2020 Jul 10:0142331220928896.(impact factor 1.956)

- H. Shoukat, M. Tahir, **K. Ali**, Approximate GP Inference for Nonlinear Dynamical System Identification Using Data-Driven Basis Set, IEEE Access, 2020 May 12;8:90665-75.(impact factor 4.098)

- M. Javed, M. Tahir,**K. Ali**, Cascaded Kalman Filtering-Based Attitude and Gyro Bias Estimation With Efficient Compensation of External Accelerations, IEEE Access, 2020 Mar 11;8:50022-35. (impact factor 4.098)

- N. Raza, M. Tahir,**K. Ali**,k-sparse Extreme Learning Machine,Electronics Letters,2020 Sep 25;56(23):1277-80.(impact factor 1.316)

- S. Saleem, A. Saeed, S. Usman, J. Ferzund, **Jahangir Arshad**, J. Mirza, T. Manzoor, Granger causal analysis of electrohysterographic and tocographic recordings for classification of term vs. preterm births, Biocybernetics and Biomedical Engineering, 2020 Jan 1;40(1):454-67.(imact factor 2.537)

- **Jahangir Arshad**, Rehman A, Rehman AU, Ullah R, Hwang SO. Spectral efficiency augmentation in uplink massive MIMO systems by increasing transmit power and uniform linear array gain. Sensors. 2020 Jan;20(17):4982.(impact factor 3.275)

- Asif RM,**Jahangir Arshad**, Shakir M, Noman SM, Rehman AU. Energy Efficiency Augmentation in Massive MIMO Systems through Linear Precoding Schemes and Power Consumption Modeling. Wireless Communications and Mobile Computing. 2020 Sep 17;2020.(impact factor 1.819)

- Anees, J.; Zhang, H.-C.; **Baig, S.;**GueneLougou, B.; Robert Bona, T.G., Hesitant Fuzzy Entropy-Based Opportunistic Clustering and Data Fusion Algorithm for Heterogeneous Wireless Sensor Network, Wireless Sensor Network, Sensors. 2020 Jan;20(3):913.(imact factor 3.031)

- Tariq Umer ; Usman Ali ; **Sobia Baig**; Zhiguo Ding, Performance Analysis of Discrete Wavelet Transform for Downlink Non-Orthogonal Multiple Access in 5G Networks, IET Communications, 2020 Mar 17;14(10):1666-74.(impact factor 1.779)
- Bilal Masood , M. Arif Khan, **Sobia Baig**, Guobing Song, Ateeq Ur Rehman,Saif Ur Rehman, Rao M. Asifand Muhammad Babar Rasheed, Investigation of Deterministic, Statistical and Parametric NB-PLC Channel Modeling Techniques for Advanced Metering Infrastructure, Energies, 2020 Jan;13(12):3098.(impact factor 2.072)
- **Muhammad Naeem Shehzad**, Bashir Q, Farooq U, Ahmed G, Raza M, Kumar PM, Khalid M. Threshold Temperature Scaling: Heuristic to Address Temperature and Power Issues in MPSoCs. Microprocessors and Microsystems. 2020 May 16:103124.(impact factor 1.16)
- N. Shabbir, M. Usman, **M. Jawad**, M. H. Zafar, M. N. Iqbal, and L. Kutt. Economic analysis and impact on national grid by domestic photovoltaic system installations in Pakistan. Renewable Energy. 2020 Jun 1;153:509-21.(Impact factor 6.274)
- **M. Jawad**, M. Bilal Qureshi, et al,A Cost-Effective Electric Vehicle Intelligent Charge Scheduling Method for Commercial Smart Parking Lots Using a Simplified Convex Relaxation Technique, Sensors. 2020 Jan;20(17):4842.(impact factor 3.275)
- W. Ahmed, H. Ansari, et al,Machine Learning Based Energy Management Model for Smart Grid and Renewable Energy Districts, IEEE Access. 2020 Oct 9;8:185059-78.(impact factor 3.745)
- Barkat A, **Hamayun MT**, Ijaz S,**Akhtar S,Ansari EA,Ghous I**. Model identification and real-time implementation of a linear parameter–varying control scheme on lab-based inverted pendulum system. Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control Engineering. 2020 Jul 21;235(1):30-8.(impact factor 1.6)
- S.Ijaz **Dr M.T Hamayun**,Adaptive Nonlinear Integral Sliding Mode Fault Tolerant Control Allocation Scheme for Octorotor UAV System,IET Control Theory & Applications(impact factor 3.526)
- M. Ashraf, S. Ijaz, **M.T. Hamayun**,An Integral Sliding Mode Fault Tolerant Control for a Class of Nonlinear Lipschitz Systems,IET Control Theory & Applications(impact factor 3.526)
- N. Taimoor, **I. Khosa, M. Jawad, J. Akhtar, I. Ghous**,M. B. Qureshi, A. R. Ansari, R. Nawaz ,Power Outage Estimation: The Study of Revenue-led Top Affected States of U.S.IEEE Access, doi: 10.1109/ACCESS.2020.3043630. (impact factor 3.745)
- **S.Sajid, M.Jawad**et al,Blockchain-based decentralized workload and energy management of geo-distributed data centers,Sustainable Computing: Informatics and Systems, 2020 Oct 15:100461(impact factor 2.798).

- Kashif Nazara, **Mujtaba Hassan Jaffery**,Design of 1 kW high temperature PEM fuel cell system and performance analysis under different operating conditionsCurrent Applied Physics,https://doi.org/10.1016/j.ca p.2020.05.005 2020. (impact factor 2.281)

- **Faisal Tariq**, Salem Alelyani, et al,Solving Renewables-Integrated Economic Load Dispatch Problem by Variant of Metaheuristic Bat-Inspired Algorithm,Energies,2020 Jan;13(23):6225.(impact factor 2.702)

- Xie, Mingyang, Muhammad Majid Gulzar, Huma Tehreem,**Muhammad Yaqoob Javed**, and Syed Tahir Hussain Rizvi. "Automatic voltage regulation of grid connected photovoltaic system using Lyapunov based sliding mode controller: a finite—time approach." International Journal of Control, Automation and Systems 18, no. 6 (2020): 1550-1560. (impact factor 2.733)

- Mirza, Adeel Feroz, Majad Mansoor, Qiang Ling, Baoqun Yin, and **M. Yaqoob Javed**. "A Salp-Swarm Optimization based MPPT technique for harvesting maximum energy from PV systems under partial shading conditions." Energy Conversion and Management 209 (2020): 112625. (impact factor 8.208)

- Mansoor, Majad, Adeel Feroz Mirza, Qiang Ling, and **M. Yaqoob Javed**. "Novel Grass Hopper optimization based MPPT of PV systems for complex partial shading conditions." Solar Energy 198 (2020): 499-518. (impact factor 4.608)

- **Safder, Muhammad Umair**, Syed Tahir Hussain Rizvi, Yongqing Meng, **Muhammad Yaqoob Javed**, **Mujtaba Hussain Jaffery**, and **Muhammad Sarmad Hassan**. "Low-Frequency AC Power Transmission and Distribution for Subsea Application Using Hexverter." Electronics 9, no. 1 (2020): 61. (impact factor 2.412)

- Jawaid, Iqra, **Muhammad Yaqoob Javed**, **Mujtaba H. Jaffery**, Aftab Akram, **Umair Safder**, and **Sarmad Hassan**. "Robotic system education for young children by collaborative-project-based learning." Computer Applications in Engineering Education 28, no. 1 (2020): 178-192. (impact factor 0.856)

- **Iqbal Muhammad Usman**, **Ejaz Ahmad Ansari,** and **Saleem Akhtar**."Interference Mitigation in HetNets to Implrove the QoS Using Q-Learning." IEEE Access 9 (2021): 32405-32424

FUNDED FYPS
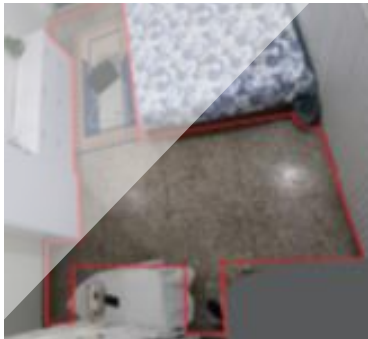
ECE participated in IGNITE-NGIRI funding cycle for the year 2020 and won 14 funding for the FYPs of its students which is a heights number among Public/Private institutions of Lahore in the field of Electrical and Computer Engineering. The IGNITE-NGIRI aims to assist students financially for developing prototypes / working models of their Final Year Projects (FYP) in order to increase creativity, innovation and hands on engineering and development skills.

ECE offers vast variety of projects including but not limited to domains of Power, Communication, Signal/Image Processing, Artificial Intelligence, Automation and Robotics, but the financial constraints hurdle the good deliverables. IGNITE-NGIRI granted a total sum of Rupees 853217 in total that helped a lot in developing quality prototypes/working models. Following lines cover the different aspects of funded projects briefly,

AUTONOMOUS NAVIGATION ROBOT

This project is Supervised by **Dr. Abbas Javed** dedicated towards the designing and developing of an indoor navigation system and embed it in autonomous mobile robot which have some display to ask the people to enter the location where he/she want to go and robot will leave the person to his/her destination and come back to its original place. To navigate in an unknown environment, the robot requires the map of that environment which is carried-out using SLAM (Simultaneous Localization and Mapping) technique- a complex array of computations, algorithms, and sensory inputs to navigate around a previously unknown environment. Determining its own location and then planning a shortest path towards destination is called robot navigation. This is done by using odometry data and path planning algorithms. Using a path planning algorithm from position of its wheels, the robot can generate a path to destination.

SMART FARMING BASED DECISION SUPPORT SYSTEM FOR OPTIMUM POTATO YIELD

Dr. Mujtaba Hussain Jaffery supervised this project to develop a Fuzzy Logic Based Decision Support System that comprises of integrated Sensor, Networking, Cloud and Decision Support layers to provide suggestions and alarms needed for optimal potato yield. The system is capable of monitoring PH, Soil Moisture, Humidity and Temperature. This Project is executed in collaboration with Potato Research Institute, Sahiwal, Pakistan. The project received Rs. 45,400 for the development of prototype.

FUNDED FYPS...

NON-INTRUSIVE LOAD MONITORING BASED SMART ENERGY MANAGEMENT SYSTEM FOR HOUSEHOLDS

Dr. Muhammad Jawadsupervised project NILM, a smart energy management system for the residential homes. Existing systems available in the market need to install sensor in every room of the building while NILM controls all the devices from a single platform and making it smart enough to perform power disaggregation. NILM employ aggregated power signal to detect the power consumption of an appliance and to control it.The project received Rs. 58400 for the development of prototype.

REHABILITATIVE STROKE ROBOT FOR PHYSIOTHERAPY

A robotic glove is designed for rehabilitate of stroke patients in this project supervised by **Dr. Mohammad Yaqoob.**Access to a Physiotherapist is difficult and expensive so this system will helps stroke patients in rehabilitation with less involvement of a Physiotherapist. The exercise of affected hand is carried out through robotic glove which is controlled by a mobile application. In this design a glove is mounted with flex sensors linked with some microcontroller to gesture the movement of robotic hand. The microcontroller reads the voltage veriations and triggers the motors to move a specific amount resulting in hand movement A secondary glove is also designed that is controlled by Physiotherapist which mimics the exercises performed by the therapist who wears the glove for special exercises.The project received Rs. 71750 for the development of prototype.

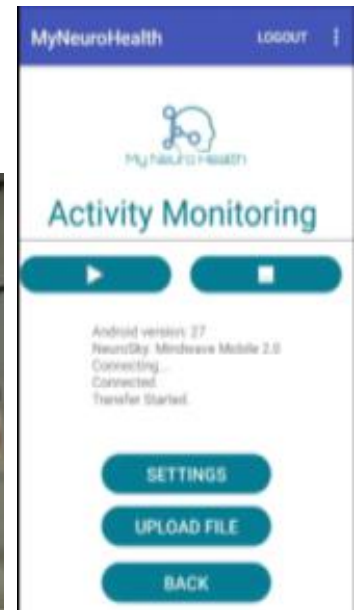## 3-DoF MOTION BASED CAR DRIVING SIMULATOR PLATFORM

This Project is carried-out under the supervision of **Dr. Muhammad Jawad** supervised. In this project a car driving simulator is designed for the beginners to familiarize them initially with the driving environment of same motions and feelings. The simulator platform is designed on three degrees of freedom (3-DoF) Roll, Pitch, and Yaw and real-time data is fetched from the game applications to create a virtual environment.The project received Rs. 79897 for the development of prototype.

FUNDED FYPS

### DETECTION AND CLASSIFICATION OF ACTIVITIES OF DAILY LIVING THROUGH EEG

Dr. Ali Nawaz Khan Supervised this project which this project aims to employ HAR (HAR) for the detection of Activities of Daily Living (ADLs) in a dedicated mobile phone application for long term behavioral monitoring. This project involves development, signal processing, database management and pattern recognition algorithm to classify these ADLs. The extended goal of this project is to integrate it with social media applications for user specific suggestions and referrals. The project received Rs. 80,000 for the development of working model.

SEMI-AUTOMATED BLOOD CHEMISTRY ANALYZER

Semi-Automated Blood Chemistry Analyzer supervised by **Mian Ahmad Yaser**, is a microcontroller-based analyzer, meant to measure biochemical parameters in human blood like glucose, urea, protein and bilirubin etc. this system is capable of automatic filter selection, sample aspiration, and other related parameter control through micro-controller-based hardware and software. It is a low-cost indigenous machine and this project received Rs. 60000 to develop prototype.
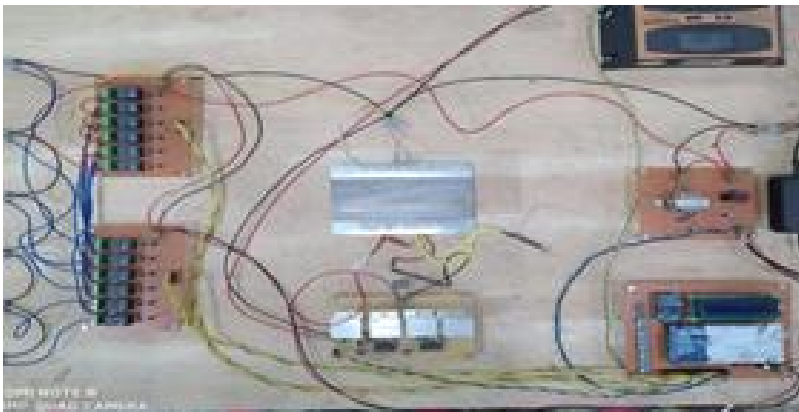

DEMAND SIDE ENERGY MANAGEMENT SYSTEM FOR HOUSEHOLD APPLIANCES

The smart load management system supervised by **Mian Ahmad Yaser**is developedElectricLoad Management (ELM) to decide the best supply for the load at a given time between two energy sources i.e. Photovoltaic source and the national grid (WAPDA). ELM can discriminate between Off-peak and On-peak hours to minimize the power consumption cost for a house.It prepares itself for On-peak hours before its arrival by ensuring the availability of the cheapest source during On-peak hours. It can also estimate the monthly electricity bill for the user based on electricity usage. This project received Rs. 49950 for the development of prototype.

FUNDED FYPS
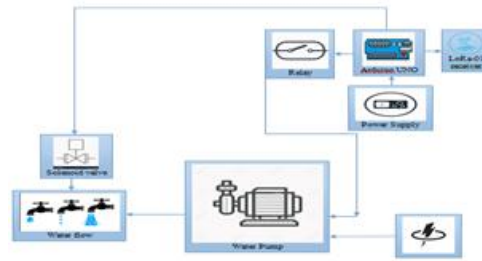
DESIGN AND DEVELOPMENT OF INTERACTIVE MIRROR WITH FACIAL RECOGNITION FOR AWARE HOME

Interactive Mirror is a voice-controlled wall mirror, referred to as "Magic Mirror" with Artificial Intelligence for the home environment is supervised by **Dr. Sobia Baig**. It can display real-time contents like time, date, weather, and news via voice commands. The mirror is capable of recognizing the face of the person as soon as he/she steps in front of it. The project received Rs. 57000 for the development of prototype.

SMART RESIDENTIAL BUILDING ENERGY MANAGEMENT SYSTEM

The project is supervised by **Dr. Abbas Javed.** The designed system is intended to optimize the energy utilization by managing the supply from two sources i.e. electrical power and natural gas. The utility companies in Pakistan have set slabs-based unit rates. The designed system monitors the energy usage and switches the appliances between the energy sources for energy supply to restrict the slab to lower rates. The project received Rs. 75400 for the development of prototype.

SMART IRRIGATION SYSTEM USING WIRELESS SENSORS NETWORK

This project is supervised b y**Dr.Sobia Baig**in which smart irrigation system is designed to optimize the supply of water to a farm from a tube well. In this design sensor nodes note the temperature, humidity and soil moisture on routine bases and provide the data to supervisor node which decides to switch the tube well ON and OFF.The project received Rs. 19715 for the development of prototype

FUTURISTIC AUTONOMOUS CAR

Dr. Muhammad Naeem Awais this project and the aim is to provide a model for the development of Autonomous Car which is capable of controlling and moving automatically. The designed system makes the car capable of visualizing its surrounding with the help of the LIDAR sensor, IR sensor, Ultrasonic sensor and camera to create a 3-D map of its surroundings which helps in planning its route and motion. The project received Rs. 45592 for the development of working model.

FUNDED FYPS

E POWER HYBRID BIKE

Dr. Mohammad Yaqoob supervised this project in which a design of hybrid bike running on both gasoline and electric is practically implemented. The design deals with the environmental pollution and fuel consumption of gasoline engineswhile on other hand gives a solution to long charging time and low battery backup by combining both the technologies. The proposed system is implemented on conventional bikes used in Pakistan. The project received Rs. 79500 for the development of prototype.

PERMANENT MAGNET EFFICIENT ELECTRIC GENERATOR

The project supervised by**Dr. Muhammad Naeem Shehzad** to develop novel permanent magnet-based generator for the generation of electrical power along with control system. The control system is meant to maintain the RPM of the generator by considering the load. The project received Rs. 45000 for the development of prototype.

FIRE ALARM CONTROL TRAINING

A training session related to operate Fire Alarm Control Panel was conducted on Friday, 21st February, 2020 by the Safety Committee.

RECTOR VISIT

Dr. Ejaz A. Ansari, HoD-ECE hosted the Lab visit of the Honorable Rector, CUI, Prof. Dr. Muhammad Tabassum Afzal and Worthy Director, CUI Lahore Campus, Prof. Dr. Syed Asad Hussain on Wednesday, 26th August, 2020.

LAUNCH OF NEW MS AND PHD PROGRAMS

COMPUTER ENGINEERING

Given the resources available in terms of faculty and equipment in Computer Engineering Program at ECE department CUI Lahore Campus, the department has submitted the proposal to initiate the following two programs in Fall 2021:

- MS in Computer Engineering
- PhD in Computer Engineering

These programs cover vast areas such as VLSI, Embedded and Real Time Systems, Digital Image Processing, Database Management Systems, Software Systems, Computer Control and Robotics, Machine Learning and Artificial Intelligence.

POWER AND SUSTAINABLE ENERGY SYSTEM

The power system study is about keeping things in balance. Not just the balance between generation and load or between production and consumption of reactive power. It is also about the balance between the cost of energy and its environmental impact or the balance between the reliability of the supply and the investments needed to develop the system. This program will teach you how to quantify both sides of the seequations and then how to improve the balances through technological advances and the implementationof sophisticated computing techniques. The sustainability is another key needed in order to make the necessary improvements in energy supply,and more

specifically in terms of energy utilization and consumption. Natural resources are being depleted and are undergoing more complex procurement procedures, therefore creating the need to have a specialized understanding in the field of the sustainable energy systems of tomorrow.

RENEWABLE ENERGY

Renewable energy engineers work to increase the energy production from clean energy sources like wind, solar, hydro, biomass etc. Renewable energy has a major part to play in the transition to the low carbon economy. Renewable energy engineers focus their efforts on developing new means for energy extraction and designing energy-efficient machinery. The sector for green jobs is continually growing, so students getting a degree in this field can expect to see a lot of job opportunities after graduation. The urgent need to cut carbon emissions makes the development of renewable energy technology essential. But renewable energy brings other potential benefits as well. Renewable energy can enable economic development in developing countries. According to vision 2030, the government of Pakistan plans to increase the share of renewable energy in total power generation to 30% by 2030, referring to power from wind, solar, small hydro and biomass.

COVID-19 OUTBREAK
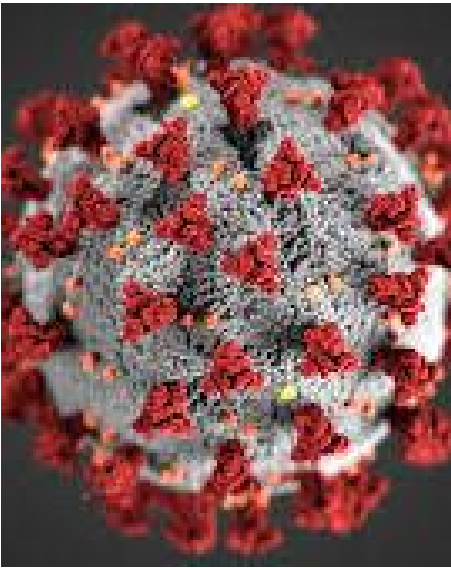
Due to prevailing situation of corona virus in Pakistan, all educational institute in Pakistan are shifted to asynchronous online system from conventional physical teaching system. In Electrical and Computer Engineering department of CUI, several committees were established at departmental level to figure out strategies and operating procedure for smooth and effective conduction of classes and labs. For this, the theory and software-based Labs in ECE department are shifted to asynchronous online mode while hardware-based lab shifted to conventional physical teaching mode.

Hardware Based Labs:

For hardware-based lab, the mode of teaching was same as before covid-19. But due to pandemic situation, number of students per group are reduced to maintain social distance between students. In addition to this all students are directed to follow corona SOP's advised by government of Pakistan.

Theory and Software Based Labs:

In covid-19 situation, the theory lecture and software labs were conducted online. The student advisors and subject resource person putt their efforts to make this online teaching method as effective as conventional teaching system. The sub committees and subject resource persons adopted innovative methods to improve the online study techniques and assessments to fulfill guideline provided by Pakistan Engineering Council. The online training session was also arranged by department to educate faculty about online teaching and assessments. The students admire the departmental policies and teaching methods in theory and in lab as well.

ESTABLISHMENT AND TRAINING FOR POWER TRANSMISSION LAB

Pakistan Engineering Council has granted a permission to start Electrical Power Engineering Program under the Department of Electrical and Computer Engineering, CUI Lahore, subject to the establishment of its labs. In this regard, CUI Lahore had purchased five apparatuses for power transmission Lab from a Karachi based company known as Electromechanica. In these apparatuses Power transmission model are implemented for teaching purposes. The hardware includes short, medium and long transmission line models, power quality analyzers, double busbar model, fault analysis mechanism, IDMT relays and Resistive, Capacitive and Inductive loads.

Training session for Power Transmission Lab:

Power transmission lab is newly established lab in Electrical Department. The main trainer for this lab was purchased by Electromechanica. Their team of 4 members visited COMSATS University Islamabad, Lahore Campus on Monday, 8th June 2020 to Wednesday, 10thJune 2020 (three days activity) for training and Commissioning of the trainers. Seven teachers and two Lab staff took this training. It was a full day activity. Initially their team gave a detailed lecture about the apparatus and then they perform experiments on the trainer. Finally, our staff did hands-on practice on trainer and eliminate all the queries related to apparatus.A training session for power transmission lab was conducted on Tuesday, 9th June, 2020 which was attended by 6 faculty members.

1. Mr. M. Umair Safdar, Lecturer

2. Ms. Nisma Saleem, Lecturer

3. Ms. Sara Sajid, Lab Engineer

4. Ms. Arfa Tariq, Lab Engineer

5. Hafiz Mubashir Tariq, Intern

6. Mr. Zahid Khan, Intern

FACULTY
RE-JOINING/HIRING/TRANSFERRED

Mr. Ali Mansoor Pasha

Mr. Ameer Hamza

Mr. Umair Shafique

Educational Background

- M.S. degree (2009) in Electronics and Communication from University of Engineering and Technology Lahore, Pakistan.
- B.S. degree (2002) in Electronics and Communication from University of Engineering and Technology Lahore, Pakistan.

Research Interests:

- Power Electronics
- Micro Electro-Mechanical Systems (MEMS)
- Embedded Engineering
- Graphene's Applications in Electronics
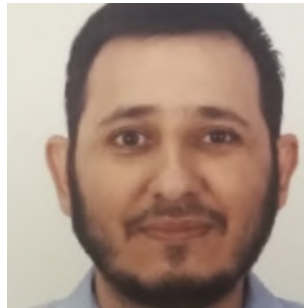
Educational Background

- Phd (In progress) in Control science and engineering from Nanjing University of Science and Technology
- MS in Electronic Engineering from International Islamic University Islamabad
- BS in Computer Engineering from COMSATS University Islamabad, Lahore Campus

Research Interests:

- Microgrid operations and control, distributed cooperative control, consumer electronics.

Educational Background

- MS in Computer Engineering from National University of Science and Technology (NUST) Islamabad
- BS in Electrical Engineering from University of Lahore

Research Interests:

- Wireless sensor networks

FACULTY
RE-JOINING/HIRING/TRANSFERRED

Mr. Muhammad Mohsin

Mr. Syed Aamir Hussain Shah

Mr. Ali Raza

Educational Background

- Phd (In progress) in Control science and engineering from Nanjing University of Science and Technology
- MS in Communication System from Lancaster University UK
- BS in Computer Engineering from COMSATS University Islamabad.

Research Interests:

- Green Wireless Communication
- Network Security
- Control Systems
- Smart Grid
- Mr. Ali Raza

Educational Background

- MS Electrical Engineering Lahore University of Management Sciences (LUMS),Pakistan.Sep 2015 to Jun 2017
- B.Sc Electrical Engineering University of Engineering and Technology, Lahore,Pakistan, Oct 2010 to Aug 2014.

Research Interest:

- Smart Grids, DC Microgrids, DC Nanogrids, Energy Management, Water & Energy Policy, Mixed Signal Design, Nano-electronic Devices, Photovoltaic Devices.

Educational Background

- PhD (Information Engineering)Xi'an Jiaotong University, China. "ongoing"
- MS (Electrical Engineering)National university of Computer & Emerging Sciences.
- BS (Electrical Engineering)COMSATS University Islamabad, Lahore Campus.

Research Interest:

- Computer Vision, Image Processing, Machine Learning, Deep Learning,.

GRADUATED STUDENTS

Umer Ehsan

Establishing guidelines for detailed testing and comparative analysis of protection relays (Differential and Distance) installed at Extra High Voltage Grid Stations in Pakistan

Umer Farooq

Switch Ladder Multilevel Inverter for THD Improvement Using Space Vector Pulse Width Modulation

Zeeshan Arif

Health Assessment of Human Knee using Acoustic Emissions

Umar Javed

Short-term and Medium-term Electrical Load Forecasting using Deep Learning Algorithms

GRADUATED STUDENTS

Shan E Ali

HAR System for Long Term Health Profiling using Machine Learning Techniques

Talha Zab

Robust Kalman Filtering for 2-D Nonlinear Systems

Muhammad Saqib Ashraf

Performance enhancement of maximum power harvesting on buck boost convertor in PV system under complex partial shading condition

Khansa Tariq

Output Feedback Fault Tolerant Control Solution Considering Imperfect Fault Information for Linear Parameter Varying Plants

Muhammad Annas Hafeez

An efficient solar energy harvesting technique for PV systems under CPS conditions.

Muhammad Saad Sarfraz Khan

Machine & Deep Learning Based IOT Intrusion Detection System for Cyber Security by Using Different Feature Selection Method

Ayesha Khan

Real-Time Implementation of a High Power Three-Phase Hybrid Shunt Active Harmonic Power Filter using Hardware-in-the-Loop (HIL) Simulation

Shafaq Zia

Application of Machine Learning Classifiers for Accurate Detection of Epileptic Seizures from Electroencephalography Data

Muneeba Qureshi

Neuromorphic Memristive Implementation of Quantum Gate by Controlling Quantum Bit through an Atomic level Quantum Transistor Simulation

NEWSLETTER COMMITTEE

Dr. Muhammad Yaqoob Javed   (Convener)
Assistant Professor, Electrical and Computer Engineering
Program Faculty: BSEE

Ms. Amna Arif   (Secretary)
Lecturer, Electrical and Computer Engineering
Program Faculty: BEEE

Ms. Tabassum Nawaz Bajwa (Member)
Lecturer, Electrical and Computer Engineering
Program Faculty: BETE

Ms. Wajeeha Khan (Member)
Lecturer, Electrical and Computer Engineering
Program Faculty: BCE

NEWSLETTER COMMITTEE

Ms. Sidra Saleem (Member)
Lecturer, Electrical and Computer Engineering
Program Faculty: BCE

Ms. Ghazala ushtaq (Member)
Lab Engineer, Electrical and Computer Engineering
Program Faculty: BEEE

Mr. Assad Ali (Member)
Lecturer, Electrical and Computer Engineering
Program Faculty: BCE

Mr. Ahmad Mudassir   (Member)
Assistant Professor, Electrical and Computer Engineering
Program Faculty: BCE

Mr. Imtiaz Najam (Member)
Departmental Coordination Officer

Department of Electrical and Computer Engineering