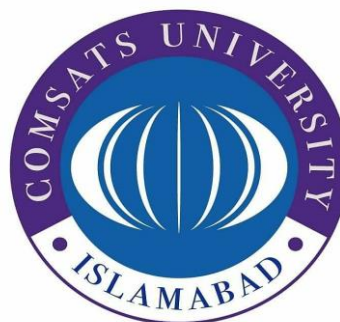




Energy Research Centre Newsletter

2022

COMSATS UNIVERSITY ISLAMABAD, LAHORE CAMPUS
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Director CUI Lahore Message

COMSATS University Isb has a major contribution towards research and development activities, emanating from its research centers, besides providing excellent teaching programs at the undergraduate and graduate levels. In this reference, Energy Research Centre, at CUI Lahore campus, has been working diligently towards the ultimate goal of establishing itself as a Centre of Excellence, with an emphasis on conventional and non-conventional energy technologies. The Centre has exercised its expertise in formulating research-based knowledge and solutions, providing capacity-building opportunities, and delivering industrial consultancy.

ERC is working on renewable energy projects funded by HEC and other organizations. ERC successfully completed a PSF-NFSC project in 2022 and is continuing with HEC-funded renewable energy projects. The Centre has been actively involved in R&D, creating awareness through workshops /seminars and providing industrial consultancy, hence creating its footprint in academia as well as in industry.

The Centre aims to prepare human resources equipped with essential solar, wind, geothermal, and machine design skills for the transition to clean and green energy. In this reference, short-term and skill-based trainings and courses are offered by the Center and are frequently attended by young professionals and new entrants in various fields of energy. Moreover, during 2022, the Centre has played an effective role in preparing undergraduate and graduate academic programs related to the field of energy.

The Centre envisages becoming a platform for joint industry-academia collaboration, so as to propose practical, efficient, and innovative solutions to address our local industry's issues, particularly related to energy. ERC's capacity building and interaction with national governing bodies like NEPRA, NEECA, and NTDC are also encouraging, MOUs with private organizations this year will pave way for future endeavors. It has been able to develop linkages at national as well as international levels. Their role in an MoU between CUI and UJFJ, Brazil, through their networking with the National Institute of Science and Technology in Electric Energy – INERGE, Brazil is one such example.

It is anticipated that significant output will be coming from this Centre in near future, and it will rise through national and international ranks



Prof. Dr. Syed Asad
Hussain
Director CUI Lahore
Campus

Head ERC Lahore Campus

Energy Research Centre, COMSATS University Isb, situated at its beautiful Lahore campus, has taken the year 2022 as an opportunity to grow in terms of capacity building within and outside the Centre, enhance industrial and organizational networking and relations, provide consultancy and continue the tradition of research and development in the form of funded projects, lab development and peer-reviewed impact factor journal publications. ERC continues to contribute in various sectors and intends to play its part in R&D as well as policy formulation in the context of energy and environment for Pakistan.

The of Central Asia Regional Economic Cooperation (CAREC) region's energy demand is expected to grow to 30 % by 2030, including electricity as the major resources of consumption. At present Pakistan, which is a member country of CAREC, is faced with challenges of Climate Change and its impact, witnessed through devastating floods in 2022, and high-cost fuels for industrial, transport and residential applications. With the present critical economic situation of our country, the need for the inclusion of renewables was never as critical, as it is today, since these offer a clean, affordable and alternative solution to energy, especially electricity generation and efficient energy utilization in all sectors. Therefore, ERC continues to generate knowledge through R&D solutions for the research community, in the form of graduate research thesis, IF publications, and testing lab development. Moreover, ERC continues to provide consultative advice to the local industry and HEIs. ERC has contributed to develop national SDG 7 policy to translate the universal SDGs into national goals and targets for effective domestic implementation. ERC has developed a Comprehensive Campus Energy Plan to 100% clean and green energy, which focuses on renewable energy production, conservation measures, and cost savings, followed by promoting sustainability and climate change mitigation through projects that would reduce or curb greenhouse gas.

On the same lines, as in previous years, in 2022, ERC signed MoU's with industries such as, EPTEck from Faisalabad, on the national scale, and on the international front, ERC played a pivotal role in an international CUI MoU with UFJF, Brazil, to collaborate with National Institute of Science and Technology in Electric Energy – INERGE. INERGE is a research institute formed by researchers from UFJF, UNIFEI, UFRJ, UFF, UFSJ and UFABC, in Brazil. The institute operates in the area of Electric Energy through the development of scientific and technological research with international quality standards.

ERC strives to play its role in the enhancement of academic activities related to energy and has contributed in preparing feasibility reports, and proposals for various academic programs, including BS & MS Energy Systems Engineering, Postgraduate Diplomas, workshops, short courses and trainings.

With the global challenge of Climate Change, reducing Carbon footprint and pledge to limit global warming to 1.5° C by nations in COP27, the role of research Centres such ERC has become significant and ERC aims to strive towards such goals in coming years through R&D.



Prof Dr. Sobia Baig
Head ERC,
CUI Lahore Campus

PSF Project Completed at ERC

Dr. Sobia Baig and Dr. Fawad Azeem successfully completed project titled “Implementation and testing of Microgrids in Rural Communities for maximum penetration of renewable energy resources in Pakistan” funded by Pakistan Science Foundation worth 6.8 million and technical report was submitted to Pakistan science Foundation (PSF) via official Channel.

Project Details:

The project titled, Design and Implementation Islanded Microgrid for Maximum Penetration of Renewable Energy in Rural Areas of Pakistan was initiated in March 2018 and was completed by March 2022. The prime objective of the project was to investigate the performance of Islanded Microgrid with maximized penetration of renewable energy resources for rural communities. Currently, there is no grid availability in the rural areas and on the other hand, operation, and maintenance-cost of diesel generators as a generation source are not suitable as a sustainable solution. Therefore, microgrids operation with maximum penetration of renewable energy resources is required as a long lasting, cost effective and sustainable solution. There are critical challenges associated to Islanded Microgrid establishment and operation, such as system economics, voltage, frequency stability and overall system resilience.

Microgrid Lab Equipment:

Two types of microgrids were designed in this project.

1. DC Microgrid
2. AC Microgrid

DC Microgrid

A DC microgrid lab was established within the available AC microgrid while developing a controller for DC wind turbine distributed generator, solar PV simulator, controllable DC load and DC storage systems. The designed DC microgrid lab can be used for DC microgrid experiments hence adding additional resource in the lab under the given AC microgrid budget.



AC Microgrid:

Given below is the detail of AC microgrid equipment.

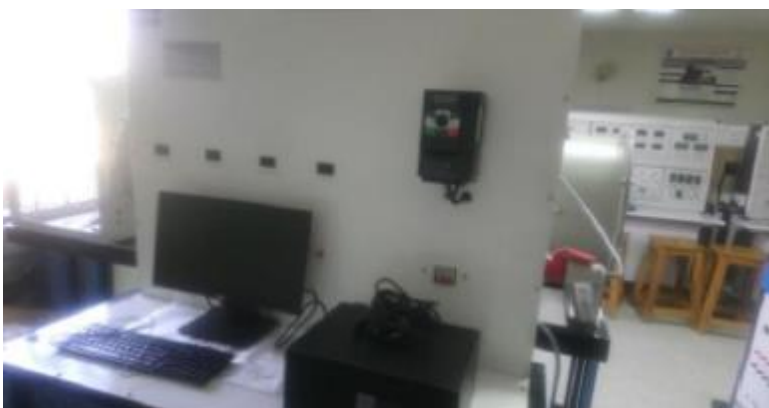
Solar Simulator: The solar simulator is programmable comprising of two 180 Watts solar PV panel along with the halogen lights to mimic the sun behavior. The solar panels angle, current, voltage can be set as desired and various results can be achieved. The solar simulator is also connected with the rest of the system.



Wind Turbine: The wind turbine is the DC generation source having variable pitch angles. The special feature of this wind turbine has controllable wind speed with the tunnel and blower. The DC wind turbine can be connected with the rest of the system.



Control System: The control system is programmable with the capability to implement multiple control algorithm at generation and load side. The programmable controller works at LabView and satisfies the functionality of Hardware in Loop (HIL). The designed algorithm in Labview can provide controls over the generation and programmable loads in hardware.



Solar Emulator and 3-Single Phase Inverters with Programmable Load: The solar emulator along with the storage and 3 single phase inverters works separately to provide testing for the solar energy, its conversion to the AC and then power to the programmable AC loads. The same system works with the storage as well. The solar emulator can charge the storage whereas storage is also connected to the inverters for providing power to the load.



In this project, the above-mentioned challenges have been addressed as four phases of research, addressing the Microgrids economics, voltage and frequency stability and resilience. In the first phase, laboratory-based research work addressed the voltage stability, using load management and battery storage coordination on developed microgrid hardware. Results show battery and load management coordination algorithm, maintained bus voltage within safe limits with 100% renewable energy resources. The setting up of Microgrid lab was reported in second annual report, In the second phase, research thesis was completed. based on economics of Microgrid using solar, hydel and battery bank was investigated.

In this research work, the viability of hydro resources in the rural canal system of Pakistan was assessed to prove its economic viability as one of the renewable energy resources. In the third phase of research, an MS thesis regarding the resilience of Microgrids using 100% The research proves that the resilience was well achieved. In addition, the research on resilience was also conducted to assess the resilience not only in extreme events but also during normal operation. The detailed result summaries along with results are attached in annex. It is anticipated that the results shall be presented in the leading journals. In the fourth phase, power factory was used under MS thesis to investigate the microgrid frequency issues using Model Predictive Control, which was proved to be a viable solution.

The research results achieved in the project will help key stakeholders such as Planning and Development Department, National Transmission and Dispatch Company, Rural Development Programs to assess the microgrid design and economic dispatch and management of renewable energy resources available at arm's length in Pakistan rural areas.

In future, a complete map of available low-cost distributed generation resources of Pakistan can be identified according to the geographic location of the country to optimally select the best renewable energy resources for the target area. There is a dire need of education and awareness for the consumer to optimally utilize their loads to develop reliable and low-cost power generation systems in rural communities of Pakistan.

ERC faculty members attended workshop on Energy Conservation by NEECA at PC Hotel Lahore. This workshop was aimed at promoting energy conservation throughout the country and to promote use of energy efficient devices and appliances. To make use of energy conservation techniques for making Pakistan energy efficient.



Dr. Sobia Baig HoD ERC and Dr. Fawad Azeem Assistant Professor ERC were provided certificates for successfully completing energy Management course by NEECA.





Training Workshop for Faculty

A workshop on teaching quality improvement was arranged in CUI Lahore Campus. The semester break between Spring 2022 and Fall 2022 was the ideal time for training of teachers/resource persons to equip them with latest trends and techniques used in teaching methodology. This step was appreciated by COMSATS Lahore management.

Workshop on Teaching Quality

Learn how to enhance your teaching quality in class & engage students for effective knowledge dissemination!

Aug 29-31, 2022

Organized by
Prof. Dr. Sobia Baig, Head Energy Research
Centre, Professor, ECE Dept., CUI-Lhr



with contributions from
ECE & Humanities Depts., CUI-Lhr



Dr. Sobia conducted Training workshop for Faculty. The basic purpose was to enhance the teaching skills of CUI Lahore teachers and equip them with modern tools and techniques. Different speakers from ECE Department and Humanities department were invited for this 3 day workshop.



COMSATS University Islamabad, Lahore Campus
ECE Department

A Workshop on Teaching Quality

Aug 29-31, 2022

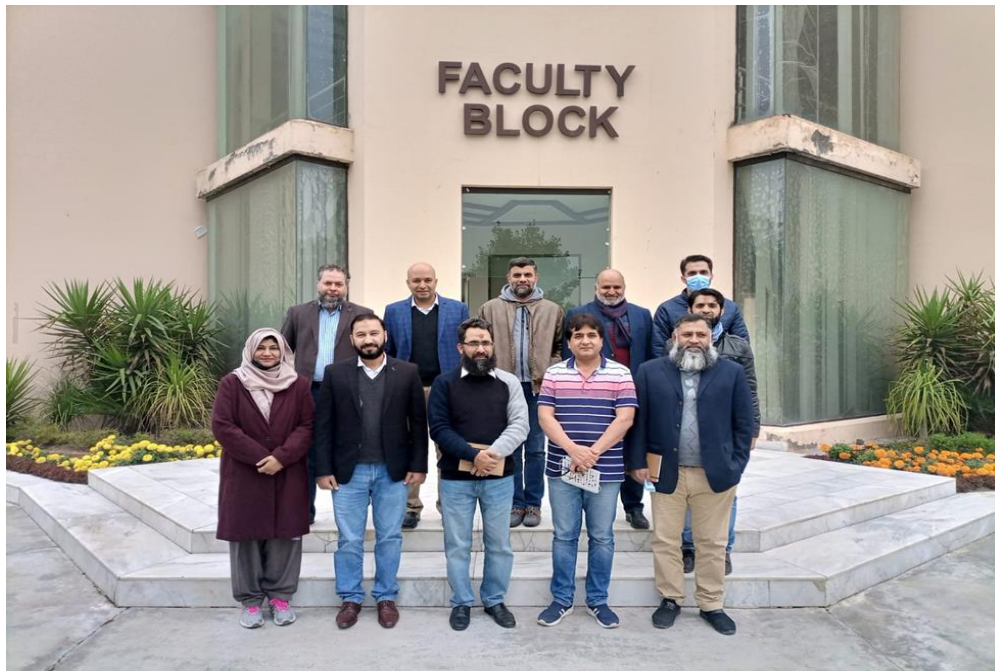
Day 1			
S.r No	Topic	Instructor/ Speaker	Time
1	Teaching Quality Framework	Professor. Dr. Sobia Baig Dr. Mujtaba Jafferey, Dr. Jehangir Arshad, Assistant Professor, ECE Department	10.30am-11.15am
2	Understanding the students Learning	Dr. Javaria Farooqi, Assistant Professor, Humanities Department	11.30am-12.15am
3	Activity		12.30am-1:30am
Day 2			
1	Engage students, stimulate interest, and encourage participation.	Madam Amna Naveed, Assistant Professor, Humanities Department	10.30am-11.15am
2	Curriculum Planning/Lecture Planning	Dr. Ejaz A. Ansari, HoD/Associate Professor, ECE Department,	11.30am-12.15am
3	Activity		12.30am-1.30am
Day 3			
1	Lecture Delivery	Professor. Dr. Sobia Baig	10.30am-11.15am
2	Assessment Planning & Evaluation	Dr. Naeem Awais, Associate Professor Dr. Tariq Mirza Associate Professor, ECE Department,	11.30am-12.15am
3	Course Feedback	Dr. Naeem Shehzad, Associate Professor, ECE Department,	12.30am-01:30am

Formal lectures regarding the subject matter were followed by interactive sessions between the teachers and the speaker for discussion regarding their personal experiences for overall improvement in teaching skills of CUI Faculty.



Visit of US Denim & US Apparel Officials

US Denim & Apparel ,a renowned textile exporting group visited COMSATS CUI Lahore Campus in January 2022 and had a meeting with ERC & ECE Faculty members. The meeting was aimed at collaboration between Industry and Academia. They elaborated about their energy and sustainability plans for the textile industries.



PEC Training Workshop

PEC training workshop was held in UET Lahore Campus. Dr. Sobia Baig and other Faculty members from ECE department attended this workshop. The training for PEVs was held at UET Lhr, and was delivered by the Malaysian Expert on Outcome Based Education, Prof. Megat Johari P.Eng. JMS, Board Member & Chair of Examination and Qualifications Committee, Board of Engineers Malaysia (BEM). The two day training covered multiple aspects of the Washington Accord and its review process from Pakistan.



HoD ERC Talk in International Conference

HoD ERC presented a talk on Microgrids-The Way Forward for Electrification of Rural Communities in 4IR 4th Industrial Revolution- Megatrends & Opportunities for Sri Lanka-Conference.

The talk included Deployment of Hybrid/DC Microgrids with DERs-Optimal and economic solution, IoT based Data Acquisition and Analytics of rural microgrids. The participants of the conference discussed categorization with reference to electricity needs and regional resources of renewable generation, Deploy Demand Side Management & Demand Response and Customized Optimal System Design for an efficient and reliable DER utilization for the regional Microgrid.

Dr. Sobia Baig highlighted the importance of remote monitoring based IOT protection, reliable operation and preventive maintenance etc. It was agreed in conference to motivate students and researchers to work for sustainable Microgrids Establishment. The conference ended on the notion that government should form a consortia of academia, industry and governmental organizations.

ERC Submitted policy points to NEPRA

ERC submitted draft for policy points to adviser National Electric Power regulating Authority (NEPRA) on the instructions given by Chairman Nepra to Head ERC.



Consultancy by ERC for COMSATS UNESCO Seminar

Dr. Sobia Baig HoD ERC and Dr. Tareq Manzoor Associate Professor ERC provided consultancy to COMSATS UNESCO Seminar.



United Nations
Educational, Scientific and
Cultural Organization

Visit to UOL for Energy Audit

ERC faculty member Dr. Fawad Azeem visited University of Lahore (UOL) for Energy Audit of their Campus and submitted proposal for Energy Audit.



MOU with Federal University of Juiz de Fora, Brazil

Federal University of Juiz de Fora, Brazil and the COMSATS University Islamabad, Islamic Republic of Pakistan, are signing a formal Memorandum of Understanding (MOU), through which both institutions are desirous to foster their relationship in order to promote national and international exchanges intended to educate students, faculty and staff members from both sides. The MoU will facilitate internationalizing the lifelong learning processes with an aim to promote academic and research programs. Prof. Dr. Sobia Baig, Head, Energy Research Centre, CUI Lahore Campus has been assigned as the Focal Person from CUI for the signing of the MoU. The MoU was signed by the Worthy Director CUI-Lhr, Professor Dr. Asad Hussain, nominated by the Worthy Rector CUI to represent him in signing the MoU at the CUI side. A ceremony was held in this context dated December 20, 2022.



ERC signed an MOU with EPTeck for collaboration in fields of smart energy, smart grids and net metering.



After the MOU Signing a meeting was held between ERC Faculty members, Registrar CUI Lahore and EpTeck Officials to discuss areas of mutual cooperation.



German Training Week (GTW)

Dr. Sobia Baig participated in the German Training Week (GTW) training (21st-25th Nov 2022) – Project Development course by the expert Craig Wong of PI Berlin on rooftop embedded solar PV projects designed for commercial and industrial (C&I). Organized by the Project Development Program (PDP), implemented by the @Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, in the framework of the Federal Ministry for Economic Cooperation and Development and German Energy Solutions Initiative of the Federal Ministry for Economic Affairs and Energy.

It covered every aspect of Project development through its developmental stages, from conceptual design, feasibility studies, engineering design, financial closure, installation, commissioning, and O&M.



Visit of ERC and Chemical Engineering Dept to US Denim

A CUI Lahore team comprising of faculty members from Chemical Engineering and Energy Research Center visited US Denim Mills Ltd. A number of different initiatives were discussed and it was mutually agreed to build close contact between CUI Lahore and US Denim. Efforts will be made to provide opportunities to students to work on industrial funded projects.



To cater to the modern energy needs, the Commission on Science and Technology for Sustainable Development in the South (COMSATS) organized an International Conference on ‘Sustainable Technologies in Modern Energy: A Roadmap Towards Green Economy’ with support of the United Nations Educational, Scientific and Cultural Organization (UNESCO), and COMSATS’ Centre of Excellence in Islamabad, the COMSATS University Islamabad (CUI). Dr Sobia Baig represented ERC in this conference.

This conference was hosted by COMSATS University at its Islamabad Campus on February 16th-17th, 2022. The aim was to provide interdisciplinary forum to academicians, scientists and early career researchers to deliberate on the importance of energy efficiency, sustainable and renewable energy resources, technologies and applications.

ERC faculty members contributed in organization of this conference and Speakers for this conference were arranged by ERC.



ERC continued its professional short technical courses in 2022. Speakers were arranged globally to share their experiences regarding latest research development in their respective fields.

“Hydrogen: The fuel of future from the past” course was conducted on 29 January 2022. The speaker was Dr . Muhammad Shakeel. Forty two students registered for the course including international students from Malaysia and Africa.



ONLINE COURSE
Course date: January 29th, 2022

Energy Research Centre COMSATS University Isb, Lhr campus
brings a new short course

Hydrogen: The Fuel of Future from the Past

Dr. Muhammad Shakeel
“Senior Lecturer” in UM Power Energy Dedicated Advance Center,
University of Malaya

Why to Attend

Current energy systems have to undergo profound transformation to compete 21st century climatic and sustainable challenges. However, the total decarbonization of certain sectors such as transportation and industry that requires high grade heat may prove to be challenging purely by means of electrification. In this regards, gaseous hydrogen being produced using renewable sources such as solar, wind, biomass etc is becoming one of the most viable fuel due to its easy production, abundant raw material and ability to be integrated in primary energy mix.

Although hydrogen industry is well established with total estimated global market of 115 billion USD by 2022 and growing significantly. The market share of hydrogen being produced by electrolysis is just 4% which is coming mostly through Chlor-Alkali industry. Recently, the ability of state-of-the art electrolyzers to compensate intermittence of renewable sources and proven concept of directly injecting hydrogen in natural gas pipeline network proved to be a game changer and could create a new downstream market.

Course Objectives

The course has been designed to provide brief understanding of hydrogen related technologies and the possible integration in primary energy mix. The attendees will learn the system level integration approaches and policy roadmaps.

Course Contents

- Introduction to hydrogen
- Production processes of hydrogen
- Green: the good and the better
- Current and potential applications of hydrogen
- Take away's
- Advantages of hydrogen

Target Audience

- Engineers of Various disciplines
- Energy Engineering
- Mechanical engineering
- Chemical Engineering
- Energy Policy makers
- Electrical engineering

Registration Fee: 500 Account Title:
● HBL CIIT: IEEE STUD
● 0023057901524103

For Registration: <http://bit.ly/ercrpd2> For Info: info.erc@cuilahore.edu.pk

Erc second course “Emerging Power System Optimisation” was conducted by Dr. Muhammad Adnan Hayat. Eleven students participated in this course. This course was also conducted online.



COMSATS University Islamabad, Lahore Campus

Webinar date: 26th February 2022 Timing: 2 pm to 4 pm

Emerging Power System Optimisation

Energy Research Centre COMSATS University Isb, Lhr campus
brings a new short course



Dr. Muhammad Adnan Hayat (PhD)

Chair - IEEE Industrial Electronics Society Western Australia Chapter
Policy Analyst – Energy Policy Department in Western Australia

Why to Attend

Power system is transforming! Conventional large generators spanning over a large geographical area are being replaced by localised generation resources. This transformation is rapid in some countries and slow in others, but this is what the future holds. This course walks through in details how the power system is transforming and how this power system can be optimised techno-economically to supply clean and reliable energy at the lowest sustainable cost.

Course Objectives

This Course will discuss in detail how the electricity market and power system is evolving and its impact on power system security and reliability. This course will then lens through how this emerging power system can be optimised using linear programming.

Course Contents	Target Audience
<ul style="list-style-type: none">• Emerging Power System.• Distributed energy resources.• Techno-economic analysis.• Reserve capacity mechanism.• Wholesale electricity Market.• Modelling assumptions, inputs, and outputs.• Conclusion.	<ul style="list-style-type: none">• Electricity policy and regulatory professionals.• Power system operators.• Power system and renewable energy engineers.• Engineering students and researchers.

For Registration: <http://bit.ly/erccpd2> For Info: info.erc@cuilahore.edu.pk

Venue: COMSATS University Islamabad, Lahore Campus

Python for Data Science, Machine learning Workshop was conducted by Dr. Muhammad Jawad. This Course was conducted on campus. A large number of students attended this paid course. The students showed keen interest in this trending topic. ERC plans for this course regular offering and to introduce advanced levels as well.



**Energy Research Centre
(ERC) & ECE Department
CUI Lahore**
Presents short course on



Venue
CUI Lahore
Campus

**PYTHON FOR DATA SCIENCE
MACHINE LEARNING WORKSHOP
1.5 CPD POINTS COURSE**

WHY TO ATTEND THIS COURSE

Machine learning is a trending topic in this age of Artificial Intelligence. The fields of computer vision and Natural Language Processing (NLP) are making breakthroughs that no one could've predicted. The machine learning is preferred to be implemented on Python because Python code is understandable by humans, which makes it easier to build models for machine learning. Since Python is general purpose language, it can do a set of complex machine learning tasks and enable you to build prototypes quickly that allow you to test your product for machine learning purpose.

COURSE CONTENTS

- Python Installation and Basics
- Data Preprocessing
- Regression (Simple linear regression, multiple linear regression, Polynomial Expression, Support Vector machine, (SVM), Decision tree Regression, Random Forest Regression,)
- Classification (k-NN, Kernel SVM, Naive Bayes, Decision Tree, Random Forest)
- Clustering (Kmean and Hierarchical)
- Introduction to ANN and CNN
- Dimensionality Reduction (PCA, Kernel PCA and LDA)
- Model Selection (k fold cross validation and Grid Search) and Boosting (XG Boost)

WHO SHOULD ATTEND

- Data Scientists
- Electrical, Computer Engineering, Computer Science Students.
- Research Students belonging to any other Allied Fields.

REGISTER NOW

<http://bit.ly/erccpd2>

FEE SUBMISSION

Account Title HBL CIIT: CPD Fund
Account Number 2305-70000826-03
Fee: 5000 PKR for Professionals
3000 PKR for CUI Students
3500 PKR for NON CUI Students



Course Instructor
Dr. Muhammad
Jawad
Associate Professor
ECE

For Info
Email at
info.erc@cuilahore.
edu.pk

SOS for BS and MS Energy Systems Engineering

ERC faculty members prepared and revised SOS (Scheme of studies) for BS Energy Systems Engineering and MS Energy systems Engineering. ERC played a key role in the preparation of the undergraduate program related to energy, namely BS in Energy Systems Engineering, to be launched from the platform of the Electrical and Computer Engineering Department. The relevant scheme of studies was prepared and submitted to the Board of Studies of the ECE Department for subsequent approval. In a similar fashion, the graduate program of energy, MS in Energy Systems Engineering was prepared and subsequently approved by the relevant statutory bodies. For both the undergraduate and graduate programs revisions were submitted for final approval by the CUI Statutory bodies.

Feasibility Reports for BS and MS Energy Systems Engineering

ERC faculty members prepared feasibility reports for BS and MS Energy Systems Engineering and submitted it to Principal Seat. The 29th meeting of the Board of Advanced Studies and Research (BASAR) approved the launching of MS in Energy Systems Engineering Program at CUI Lahore Campus, subject to the issuance of NOC from HEC, dated December 14, 2021. The BS Energy System Engineering SoS was already approved in 2020. ERC also submitted feasibility reports as per CUI format to launch the energy-relevant programs at the undergraduate and graduate levels. These reports encompassed the SWOT Analysis, prospective job markets, research opportunities, and market feasibility of these programs. For the BS program, the program's educational objectives, program learning outcomes, mapping of PLOs to PEOs, in addition to the identification of existing resources was included in the report.

Meeting Regarding Future, Performance and Progress of Research Centres at CUI

Dr. Sobia Baig represented ERC at meeting regarding prospects of research centres at CUI. The meeting was chaired by the worthy Rector CUI to review the performance and progress of Research Centres at CUI and discuss the future prospects. Head ERC participated in the meeting virtually and presented ERC's performance and progress. She presented the research funding proposals applied by the ERC faculty members, and the acquired funding and completed projects were also discussed. She presented various focus areas, such as energy efficiency and audit, industrial solutions being proposed, and various training offered to CUI alumni, students, and industrial staff members by ERC.

Detailed Solarization Report for CUI Lahore

Dr. Sobia Baig along with ERC faculty members prepared detailed solarization report for induction of solar energy for COMSATS Lahore. Meetings with different vendors were conducted and detailed comparison report was formulated and presented to Director CUI Lahore for deliberation.

ERC Contribution in CUI CONVOCATION 2022

ERC Faculty members were part of CUI Lahore team for Convocation Fall 2022 Lahore campus. Under supervision of Dr. Sobia Baig Head food Committee, different teams were mobilized for series of events at Convocation. ERC team assisted and supervised food supply chain at this event, negotiated terms & conditions with Vendor. ERC team ensured proper management at the Convocation.



List of Projects Submitted 2022 for Funding

S.R No	Project Title	Funding Agency
1	Design and Analysis of Solar PV-thermal Hybrid System Technologies “ by PI ;, Co Pi Dr. Tareq Manzoor .	HEC
2	Efficient and Flexible Fuel Combustion System through Flameless Regime. Co Pi Dr. Tareq Manzoor .	HEC
3	Interconnection & Coordination of Multi-Microgrids to Promote Penetration & Efficient Utilization of Renewable Energy(2022-2023)	Ajman University

List of MS & Phd Students 2022

Student Name	Degree	Status	Supervisor/Co Supervisor	Synopsis Title
Aizaz Mohiudin	MS	In Progress	Dr. Fawad Azeem	Impact assessment of Electrical vehicles on main grid and optimal Charging Station Infrastrucute.
Abdullah Tariq	MS	In Progress	Dr. Fawad Azeem	Design and analysis of hybrid Power Management system for trains.
Muhammad hanzala	MS	In Progress	Dr. Fawad Azeem	Design of Control Algorithm for Energy Flexibility and Quantification of Smart Building.
Usman Inayat	PhD	In Progress	Dr. Tareq Manzoor	Modeling and Parametric analysis of Solar Energy Systems.
M.Shahbaz	MS	Completed	Dr. Sobia Baig	Analysis of the Islanded Microgrid Resilience under Normal and Extreme Events.
Tulio Fernandes Moreira	MS	Completed	Dr. Sobia Baig	A Framework to unify HS-OFDM, OCDM, SCCP, AND OSDM schemes under certain interference.
Beenish Hassan	PhD	In Progress	Dr. Sobia Baig	FDD Based Channel Estimation for a mmWave Massive MIMO system using Co-ordinated Mutipoint in 5G.
Inam Ullah Khan	PhD	Completed	Dr. Sobia Baig	Optimal demands supply energy management in smartgids.
Rabia Arshad	PhD	In Progress	Dr. Sobia Baig	Wavelet Pulse Shaped Non-Orthogonal Mutiple Access Scheme for Ubiquitous Cell-free Massive MIMO Communications.
Uzma Mushtaq	PhD	In Progress	Dr. Sobia Baig	Mutli-User Cooperative Wavelet Non Orthogonal Mutiple Access Scheme for Future Radio Access.
Faisal Masood	PhD	In Progress	Dr. Sobia Baig	Prognostics and Health Management Framework for Resilient Microgrids using Machine Learning Techniques, in progress

Academic Collaboration with Other Universities

- University of the Punjab
- CERAD UET Lahore
- USPCASE-NUST
- Aalborg University Denmark
- University of Malaya
- UFJF,Brazil
- Lancaster University UK
- SCOUT China



AALBORG UNIVERSITY

Academic Collaborations within CUI

- Architecture Department
- ECE Department
- Humanities Department



Industrial Collaborations

- ETRC
- EpTeck
- Presscon Engineering (PVT) Ltd
- Al Rehman Switch Gear
- Circutor
- Jolta batteries



Government Collaborations

- NEPRA
- NEECA
- LESCO
- NTDC
- PEECA



Policy Framework Contributions

- NEECA
- Microgrid NEPRA
- World Bank



Sr. #	Title of Project	Amount (Million PKR)	Principal Investigator	Funding Agency	Department	Status Approved/Ongoing
1	Implementation and Testing of Microgrid in Rural Communities with Maximum Penetration of Renewable Energy Resources in Pakistan	6.8	PI: Dr. Sobia Baig. Co-PI: Dr. Fawad Azeem	PSF	ECE	Completed
2	Analysis of energy storage materials and systems for energy applications	6.4	Dr. Tareq Manzoor	HEC	ERC	Ongoing
3	CFD analysis of engine exhaust system	2	Dr. Tareq Manoor	PSF	ERC	Approved
4	Design, optimization based on CFD analysis of combustion of multiphase system in diesel engine	2	Dr. Tareq Manzoor	PSF	ERC	Approved
5	Basic Research and Capacity Investigation for Distributed Bio Energy Utilization via Thermo-Chemical Conversion	8.8	Dr. Zakir	PSF	ERC	Ongoing
6	Bioethanol Production from agricultural cellulosic waste using nano enzymes.	3.7	Dr. Bilal Ahmad	HEC NRPU	ERC	Approved
7	Development of Micro-texturing machine for enhancing the efficiency of Automotive components	6.3	Dr. Tareq Manzoor (Co-PI)	HEC NRPU	ERC	Approved
8	Design and Analysis of high-performance energy efficient optoelectronic devices for Pakistan	5	Dr. Tareq Manzoor (Co-PI)	HEC NRPU	ERC	Approved

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*“If you want to find the secrets
of the universe, think in terms
of energy, frequency and
vibration.”*

Nikola Tesla