



Department of Electrical & Computer Engineering

COMSATS University Islamabad, Lahore Campus

Departmental Portfolio

Why Choose ECE?



- ✓ Internationally Recognized PEC Accredited Programs
- ✓ Highly Affordable Degree Programs
- ✓ State of the Art Curriculum
- ✓ Experienced & Foreign Qualified Faculty
- ✓ Cutting Edge Lab Facilities
- ✓ Extraordinary Research Platform
- ✓ Exceptional Industrial Collaboration
- ✓ World Class Campus Facilities
- ✓ Career Development Programs
- ✓ Strong Alumni Association



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About Us



The Department of Electrical and Computer Engineering initially offered its first engineering degree program in Computer Engineering back in March 2002. The program titled BS Electrical (Telecommunication) Engineering was started in Spring 2004. The program titled BS Electrical (Electronics) Engineering was started in Fall 2012. To streamline the engineering programs as per PEC guidelines, currently the department is offering two undergraduate programs namely: BS in Electrical Engineering and BS in Computer Engineering and postgraduate programs namely: MS/PhD in Electrical Engineering. Effective from Fall 2022 session, the department will start offering MS in Computer Engineering, Energy Systems Engineering and PhD in Computer Engineering. The programs (BS in Electrical (Electronics) Engineering and BS in Electrical (Telecommunication) Engineering) have been phased out after change of scope visit by PEC in favor of BS in Electrical Engineering program. The last intake in phased out programs was taken in Fall 2016 and these programs have been accredited by PEC up to intake batches of Fall 2016. It is important to mention that last three intakes of BS in Electrical (Telecommunication) Engineering program have already been successfully accredited under level-II by PEC in its last visit in April 2019. Similarly, in June 2021, the last batch (Intake-FA16) of BS Electrical (Electronics) Engineering program and the first two batches (Intake-FA17 & FA18) of BS in Electrical Engineering program have also been accredited under level-II by the PEC.

Message from Chairman



Welcome to the Department of Electrical and Computer Engineering (ECE) at COMSATS University Islamabad (CUI).

Whether you are a student looking forward to learning or already a part of electrical & computer engineering community I welcome you to one of the best ECE-department of Pakistan for learning and research.

The Electrical & Computer Engineering department at CUI was established back in 2000, and ever since, it has excelled with an exceptional swiftness. The department offers postgraduate as well as undergraduate programs. Currently, the department offers four undergraduate (BS) programs namely, Electrical Engineering, Electrical (Power) Engineering, Electrical (Electronics) Engineering and Computer Engineering. MS in Electrical Engineering (with specialization in Electronics, Communications & Networks, Electric Power and Energy and Control & Automation) and PhD in Electrical Engineering are being offered. The CUI's engineering discipline has been ranked fourth in Pakistan and second in Federal Area.



Message from Chairman

This meticulous honour is the mere fruit of the unabating struggles of our competent staff and faculty. The department of Electrical and Computer Engineering is an integral part of that. ECE is the largest department, with approximately 3,400 undergraduate and 500 graduate students, 273 research faculty, and 140 technical staff. Over the years, immense progresses have been made in the path of improvising our faculty in accordance with the new and latest technological trends. We have made several collaborations with different prestigious Universities in the USA, UK, Sweden, Finland and Germany and sent students to acquire masters and PhD Degrees for bringing together the most revolutionary and forward- thinking minds of today. We offer a rich and wide areas of research interests including specialized faculty in Power system Dynamics & Control, FACTS & HVDC Control, μ Grid & Smart Grid Control,

Dr. Laiq Khan

Chairman of the Department



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 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. Our vision for the department is to be nationally and internationally recognized for excellent educational programs both at undergraduate and graduate levels and significantly contribute towards research which may directly or indirectly affect the socioeconomic aspects of the country. 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.



Message from Head of Department

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. The department endeavors to take a lead in advance research through the development of research groups and graduate research programs with the blend of its senior and junior faculty. A number of research groups are actively engaged in cutting-edge research activities and regularly showcase their work by participation and publishing in reputed international conferences and renowned journals. 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.



Message from Head of Department

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 and helping our beloved country by providing the desired impetus towards the biggest drive of growth i.e. human resource development. 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 teamwork efforts.

Dr. Engr. Ejaz A. Ansari
Head of the Department



Vision & Mission



To be recognized globally as one of the leading departments of engineering education

Mission Statement

To provide Electrical and Computer engineering students with a strong technical education and communication skills that will enable them to have successful careers

To prepare competent electrical and computer engineering graduates conscious of professional, ethical and social responsibilities for productive engineering careers in industry, academia and research both locally and abroad

To instil in electrical and computer engineering students a strong sense of humanistic values and professionalism such that they can conduct ethically.

Why Choose ECE

For the last two decades, the brightest and most exceptional minds from across the country and parts of the world have selected department of Electrical and Computer Engineering CUI, Lahore as their department of choice. What sets us apart? We are among the best electrical and computer engineering departments in Pakistan with

- ✓ Highest number of PhD faculty graduated from top ranked international universities.
- ✓ Lecture rooms/theatres with latest audio-visual facilities and labs equipped with advanced engineering equipment and computing facilities.
- ✓ Excellent research platform for postgraduate students with
- ✓ Opportunity to work under multiple research groups in different areas
- ✓ Duly accredited programs under level-II accreditation (Washington Accord) by Pakistan Engineering Council (PEC).
- ✓ Collaboration and Outreach Committee (COC) of the department provides opportunity for alumni to reconnect with their alma mater and to recognize the contribution of graduates towards industry.
- ✓ World class campus facilities i.e., Hostels, Mosque, Cafeteria, book shops, gym, sports grounds etc



ECE & CUI Rankings

For	Engineering & Technology
THE 2018	301-400
THE 2019	301-400
THE 2020	251-300



CUI crosses a milestone of



3G Award for Research Excellence 2018 and for Excellence in Higher Education Award 2019



Programs offered

The Department of Electrical and Computer Engineering traditionally offers both the undergraduate and graduate programs in Electrical Engineering (BS, MS & PhD) and Computer Engineering (BS, MS & PhD). The undergraduate degree programs are duly accredited with the Pakistan Engineering Council (PEC) under level-II accreditation (Washington Accord) since Fall 2015 intake

Programs Offered

Undergraduate Programs

Bachelor of Science in:

- ✓ Electrical Engineering (BSEE)
- ✓ Computer Engineering (BSCE)

Graduate Programs

Master of Science in:

- ✓ Electrical Engineering MS(EE)
- ✓ Computer Engineering MS(CE)
- ✓ Energy Systems Engineering MS(ESE)

Doctor of Philosophy (PhD) in

- ✓ Electrical Engineering
- ✓ Computer Engineering

Our Faculty

The faculty at **Electrical and Computer Engineering** department is highly experienced and provides enriching academic experience to the students. It comprises of **37** PEC registered engineers holding MSc/PhD engineering degrees. Currently we have **22** PhD dedicated faculty members who are also PEC accredited professional engineers.

Qualification	ECE Faculty
Ph.D.	22
M.Sc. Engg.	32
B.Sc. Engg.	02
Total	56



Our Faculty

Faculty	Designation	Research Area
<u>Dr. Engr. Ejaz A. Ansari</u>	Head of Department /Associate Professor	Signal Processing and Performance Analysis of Wireless Communication Networks
<u>Dr. Sobia Baig</u>	Professor	Digital Communication/Digital Signal Processing, NOMA for 5G mobile networks, Smart Grid Communication Techniques,
<u>Dr. Saleem Akhtar</u>	Principal Engineer	Wireless Multimedia Information Systems, Mobile Computing, Quality of Service (QoS) Provisioning and Radio Resource Management in Heterogeneous Wireless Networks (Specially 3G/4G Mobile Cellular Systems HSPA, LTE, WiMax), Network Architecture and Pro
<u>Dr. Mirza Tariq Humayun</u>	Associate Professor	Fault tolerant control, Sliding mode control, Reconfigurable control, Fault detection and Isolation, Optimization control theory
<u>Dr. Asim Ali Khan</u>	Associate Professor	Phased array pattern synthesis, optimisation, heuristic algorithms, antenna design, antenna theory, array processing, wideband arrays, small antenna arrays, direction of arrival (DOA) and tracking, adaptive arrays, micro/millimetre-wave imaging
<u>Dr. Muhammad Naem Shehzad</u>	Associate Professor	Embedded systems, Processor scheduling, Digital electronics, Compute Architecture Computer architecture
<u>Dr. Muhammad Jawad</u>	Associate Professor	Power Systems, Smart Grids, Renewable Energy, Power Management, Optimization
<u>Dr. Muhammad Naem Awais</u>	Associate Professor	Resistive Switching Devices (MEMRISTOR), Micro & Nano Device Fabrication and Characterization, Printed Electronics, Electrohydrodynamic (EHD) Printing and Embedded Systems
<u>Dr. Mujtaba Jaffery</u>	Associate Professor	Application of Control Systems, IoT, Machine learning, Neural Networks and Fuzzy Logic in Robotics, Electric Vehicles Aerospace and Energy/Power based systems
<u>Dr. Ali Nawaz Khan</u>	Assistant Professor	Mobile Cellular Networks, WSNs, WBAN, Healthcare Applications of PANs
<u>Dr. Muhammad Farooq –i-Azam</u>	Assistant Professor	Wireless Communication, Wireless Networks, Machine Learning, Artificial Intelligence, Cognitive Radio Networks, Wireless Sensor Networks, Network Navigation, Electrical and Electronic Circuits, Smart Grid, Information and Embedded Systems Security



Our Faculty

<u>Dr. Abbas Javed</u>	Assistant Professor	Application of Control Systems, IoT, Machine learning, Neural Networks and Fuzzy Logic in Robotics, Electric Vehicles Aerospace and Energy/Power based systems
<u>Dr. Jehangir Arshad</u>	Assistant Professor	Efficient resource allocation in massive MIMO communication systems for 5G networks, Network Security, Internet of Things, Alternate Energy Systems
<u>Dr. Khurram Ali</u>	Assistant Professor	Statistical signal processing, Machine learning, Satellite navigation technologies, Signal processing for GNSS receivers, Estimation and detection theory, Multisensor fusion, Intelligent transportation systems
<u>Dr. Muhammad Nadeem Rafiq</u>	Assistant Professor	Antennas, EMI/EMC & Applied Electromagnetics
<u>Dr. Khurram Zaidi</u>	Assistant Professor	Wireless Communications, NILM, IoT Devices and Network Design
<u>Dr. Imran Ghous</u>	Assistant Professor	Control theory and its applications, Stability Analysis, Controller/observer Synthesis, 2-D Systems, Switched Systems, Nonlinear Systems etc.
<u>Dr. Ikram Ullah Khosa</u>	Assistant Professor	Digital Image Processing, Computer Vision, Machine Learning
<u>Dr. Muhammad Yaqoob Javed</u>	Assistant Professor	Stand-alone Solar Photovoltaic (PV) systems including DC micro-grids, DC-DC converters, I-V Curve tracing, maximum power point trackers for PV systems, PV plant energy evaluation and partial shading effects
<u>Dr. Arsla Khan</u>	Assistant Professor	Multirate Signal Processing, 5G Communications
<u>Dr. Aamer Bilal Asghar</u>	Assistant Professor	Intelligent Control, Power and Renewable Energy, Wind Energy systems, Electronics, Fuzzy Systems, Artificial Neural Networks, Adaptive Neuro-Fuzzy systems
<u>Dr. Saad Aslam</u>	Lecturer	Wireless Communication & Machine Learning
<u>Mr. Ahmad Mudassir</u>	Assistant Professor PhD in Progress	Circuits and Electronics, Digital System Design, System Software, 4G/5G Communication Networks
<u>Mr. Ali Mansoor Pasha</u>	Assistant Professor	Power Electronics, Micro-Electro-Mechanical-Systems (MEMS)
<u>Ms. Ayesha Ali</u>	Assistant Professor	Hybrid Electric Vehicles, Energy Management



Our Faculty

<u>Mr. Mian Ahmad Yaser</u>	Assistant Professor	Telecommunications, Optical Fiber Communications, Optoelectronics, Data Communication and Networks, Circuit Analysis, Renewable energy, PV Solar, Three phase Inverter design, Microcontrollers, Broadband Technologies
<u>Mr. Muhammad Usman Rafique</u>	Assistant Professor	Power Electronics, High-Efficiency DC-DC converters
<u>Mr. Syed Jawwad Haider Gillani</u>	Assistant Professor	ICT/Energy/Power Policy, Renewable Energy, Smart Grids, Contract Management & Dispute Resolution in Engineering Projects, Engineering Management, Bio Medical Engineering Applications, Data Communications, Bio Informatics.
<u>Mr. Ameer Hamza</u>	Lecturer	Cyberphysical systems, Microgrid Operations and Control, Distributed Power Systems, Power Electronics, Renewable Energy (Wind Power), Control systems and robotics, Consumer Electronic Market.
	PhD in progress	
<u>Ms. Amna Arif</u>	Lecturer	Wireless Networks
<u>Mr. Assad Ali</u>	Lecturer	Signal and Image Processing
<u>Ms. Madiha Sultan</u>	Lecturer	Power Electronics devices, AC-DC Converter design, DC-AC converter design
<u>Ms. Mayyda Mukhtar</u>	Lecturer	Wireless Sensor Networks, Wireless Body Area Networks, Secure Communication, Medical Imaging
<u>Mr. Mian Hassan Aslam</u>	Lecturer	Embedded Systems and Digital Image Processing
<u>Mr. Moazzam Ali Sahi</u>	Lecturer	Digital Image Processing, Computer Architecture, Software Development, Microcontroller /Microprocessor based system design
<u>Mr. Modassir Ishfaq</u>	Lecturer	Wireless Sensor Networks, IOT and network security
<u>Mr. Muhammad Ali Raza</u>	Lecturer	Computer vision, Image processing, Machine Learning, Deep Learning
	PhD in Progress	
<u>Mr. Muhammad Talha Raheem</u>	Lecturer	Power system Analysis, High Voltage Engineering, Renewable energy, Smart grid, Smart Buildings
<u>Mr. Muhammad Usman Iqbal</u>	Lecturer	Signals and Systems, Wireless Communication, 5G Cellular Networks
<u>Mr. Nesruminallah</u>	Lecturer	Satellite Communication System, Link budget analysis and design, Microprocessor and System Interfacing

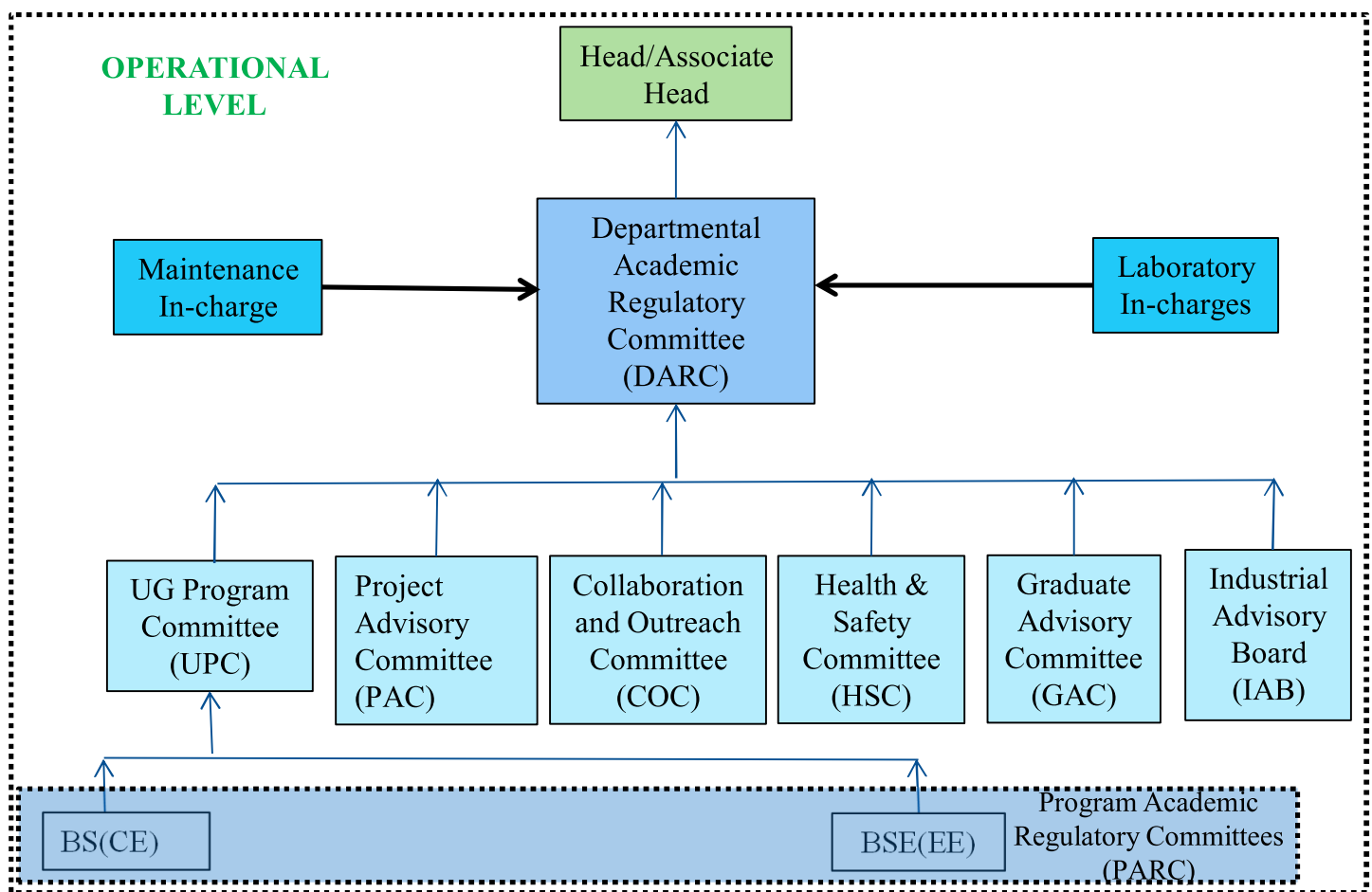
Our Faculty

<u>Ms. Nisma Saleem</u>	Lecturer	Power system operation, Smart Grid, Unit Commitment, Energy management, Renewable energy
<u>Ms. Sara Sajid</u>	Lecturer	Power Protection, Cost Optimization and Energy management of data centers , Power Electronics , HVDC transmission systems
<u>Ms. Sidra Saleem</u>	Lecturer	Computer Architecture
<u>Mr. Syed Ahmed Faran</u>	Lecturer	Wireless Networks, Performance Evaluation, Mathematical Modeling, Machine Learning
<u>Mr. Syed Junaid Akhtar</u>	Lecturer	Wireless Networks
<u>Ms. Tabassum Nawaz Bajwa</u>	Lecturer	Signal Processing
<u>Mr. Taimoor Naeem</u>	Lecturer PhD in Progress	Antenna Engineering, Electromagnetic metasurface, Applied electromagnetics, Optical Engineering
<u>Mr. Umair Shafiq Khan</u>	Lecturer	Wireless Sensor Networks
<u>Ms. Wajeeha Khan</u>	Lecturer	Embedded systems and Computer Architecture
<u>Mr. Zaid Ahmad</u>	Lecturer	Wireless Communication, Low-Power Wide Area Networks (LPWANs), Machine-to-Machine (M2M) Communication, Industrial IoT, Industry 4.0
<u>Mr. Abu Bakar Talha Jalil</u>	Lab Engineer	Industrial Automation, Image processing, Bio-Medical Engineering
<u>Ms. Arfa Tariq</u>	Lab Engineer	Power Electronics, Power systems, Neural Networks, Smart Grid
<u>Mr. Faisal Tariq</u>	Lab Engineer	Power Systems, Economic Load Dispatch, Unit Commitment, Optimization Techniques
<u>Ms. Ghazala Mushtaq</u>	Lab Engineer	Linear and Non-Linear Control, State Estimation, Fault tolerant Control(FTC), Robotics, Electronics
<u>Mr. Muhammad Usman</u>	Lab Engineer	Nano Electronics/Embedded Systems
<u>Mr. Sarmad Hassan</u>	Lab Engineer	Embedded System, Electronics, Robotics



ECE Organogram

The following hierarchy represents the working skeleton of the department of electrical and computer engineering. Head of the department leads the administrative front of the department.



ECE Organogram

ECE department has multiple committees to ensure smooth conduction of Academic, Administrative, Research, Curricular and Extra-Curricular affairs. A senior faculty member convenes each committee to carry-out the related tasks at operational level.

Undergraduate Program Committee (UPC)

The Undergraduate Program Committee (UPC) overlooks the two Program Academic Review Committees (PARCs) of Electrical Engineering & Computer Engineering. Its main function is to review the programs academic activities including CDF's, resource person's feedback, result analysis of both the programs and their Continuous Quality Improvement (CQI) cycles to achieve OBE objectives.

Project Advisory Committee (PAC)

Final Year Projects (FYP) in Department of Electrical & Computer Engineering, COMSATS University Islamabad, Lahore Campus are considered as group projects mandatory for every student after the completion of 6 semesters. One student is selected as group leader. Supervisors (and Co-supervisors if available) are assigned. FYP ideas are selected with the mutual consent of supervisors/co-supervisors and students. FYP Management committee sees through the successful conduction of the assessment of these projects at various stages of the project life cycle.



ECE Organogram

Collaboration & Outreach Committee (COC)

This committee handles alumni networking, industrial tours, job placement and event management. The major focus is to ensure and establish a healthy relation with alumni, arrange job fair and market departmental achievements.



Health & Safety Committee (HSC)

Safety is an important aspect which is of prime importance to the working environment in any organization. Working environment of a university includes classrooms, laboratories, offices, stores etc. A 'Health and Safety' committee has been formed in the supervision of a senior faculty member. The aim of this committee is to remove or reduce the risks to the health, safety and welfare of all students, faculty members, visitors and contractors, etc.

ECE Organogram

Graduate Advisory Committee (GAC)

The Graduate Advisory Committee (GAC) is notified by the department every semester/year. The committee comprises of Head of department as convener, a PhD faculty member as secretary and 7-8 PhD qualified faculty as members. The GAC is authorized to discuss all the graduate degree matters i.e. MS and PhD level studies at the department such as course offerings, faculty allocation to courses and results analysis etc. The students' requests regarding leave of absence, exam retake in case of emergency, degree duration extension as well internal research/synopsis supervisory committee formulation are discussed and decided by this committee. Likewise, the matters for PhD students are also discussed and decided such as research internal supervisory committee formulation, the comprehensive exam notification and the faculty allocation for PhD comprehensive exam papers setting. Moreover, all kind of occasional requests from MS and PhD students are discussed by this committee and decisions are made collectively.



ECE Organogram

Industrial Advisory Board (IAB)

Industrial advisory board is a platform where industrial representatives are encouraged to come forward to advice on strategic areas of curriculum development, research and fundraising. The objectives of IAB include but are not limited to:

- ✓ To build a strong foundation of support and communication between ECE and industry
- ✓ To discuss the curriculum and learning outcomes from industrial point of view
- ✓ To discuss internship opportunities to students of ECE department
- ✓ To discuss opportunities of industrial visits for students of ECE department



ECE Organogram

Following are the esteemed members from industry providing their services for Industrial Advisory Board

Name	Organization
Dr. Suhail Aftab Qureshi	South Asian Electrical Concern
Mr. Zeeshan Altaf	Mentor Graphics
Mr. Ammad W. Malik	Magnet Holdings
Mr. Usman Qureshi	ICT Integrators
Ms. Amra Rafiq	PEPSI CO. Pakistan
Ms. Kiran Fatima	Dell EMC
Mr. Ali Raza Baloch	PTCL
Mr. Abdul Ghafoor	MicroTech Industries (Pvt.) Ltd
Mr. Fahmeed Akram	KICS
Ms. Aafia Khan	DESCON
Mr. Jawwad Tanvir	Metallogen (Pvt.) Ltd.
Mr. Irfan Aslam	SUPARCO
Mr. Asim Shabih Zaidi	SUPARCO
Mr. Aitizaz Khalid	Vision Telecom Pvt. Ltd
Mr. Shahzeb Rathore	Advance Systems

Undergraduate Admissions

Admission Criteria for BS(CE)

- ✓ Intermediate or equivalent with Physics, Mathematics, Chemistry having minimum of 60% marks OR
- ✓ DAE in the same/relevant discipline of engineering as specified by Pakistan Engineering Council (PEC) with minimum of 60% marks from an accredited educational institution
- ✓ He/She must have secured at least 50% marks in the entrance test conducted by NTS.

Admission Criteria for BS(EE)

- ✓ Intermediate or equivalent with Physics, Mathematics, Chemistry, Computer Science having minimum of 60% marks OR
- ✓ DAE in the same/relevant discipline of engineering as specified by Pakistan Engineering Council (PEC) with minimum of 60% marks from an accredited educational institution
- ✓ He/She must have secured at least 50% marks in the entrance test conducted by NTS.

Merit Criteria

All admissions are regulated by merit determined on the basis of weighted marks—obtained in the entrance test by NTS and marks obtained in previous public examinations (Matriculation / F.Sc Pre-Engineering). The criterion of admission is as follows:

Examination	% Weight-age
Matriculation	10 %
Intermediate (Pre engineering)	40 %
Entrance Test (NTS)	50 %



Graduate Admissions

Admission Criteria For MS

- ✓ A 16 years degree in the relevant field from an accredited educational institution with First Division (annual system) or CGPA 2.5/4.0 (semester system).
- ✓ No third division or D grade throughout the academic career.
- ✓ GAT (General) with 50% marks.

Merit Criteria For MS

Examination	% Weight-age
Matriculation	5%
Intermediate (Pre engineering)	10%
Graduate Degree (2 Years) Masters Degree (2 Years) Or Graduate Degree (4 Years)	10% 15% Or 25%
GAT/GRE Test Score	40%
Interview	20%



Graduate Admissions

Admission Criteria For PhD

- ✓ An MS/MPhil with Thesis/research project or its equivalent degree with Thesis/research project in the relevant field from an accredited educational institution with minimum CGPA of 3.0/4.0 under semester system or 70% under conventional system with no third division or D grade throughout the academic career.
- ✓ GRE (subject) as per HEC policy, or GAT (subject) with at least 60% marks.
- ✓ For admission in PhD Electrical Engineering Program, any one of the existing GAT (subject) tests in Electrical, Telecom or Electronics Engineering will be acceptable with a minimum score of 60% marks.

Merit Criteria For PhD

Examination	% Weight-age
Matriculation	5%
Intermediate (Pre engineering)	10%
Graduate Degree (2 Years) Masters Degree (2 Years) Or Graduate Degree (4 Years)	5% 10% Or 10%
GAT/GRE	25%
Interview	30%



Teaching Philosophy

Our Teaching Philosophy is based on: OUTCOME BASED EDUCATION

Implementation

- Outcome Based Education (OBE) is a process that involves assessment and evaluation practices in education to reflect the attainment of expected learning in three domains as knowledge, skill and attitude (KSA) and showing mastery in the programs area.
- Our undergraduate programs in Electrical and Computer Engineering strictly follows the OBE model. Acknowledging the implementation of OBE, PEC has granted accreditation to our BS Power Engineering, BS Electronics and BS Computer Engineering programs under Level-II (Washington Accord).
- The OBE based accreditation provides new opportunities to our graduates and remove barriers in their international mobility for higher studies and job across the world.



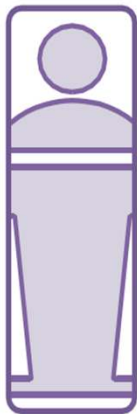
Applied Knowledge



In a knowledge-based society, knowledge that leads to innovation and commercial activity is now recognized as critical to economic development



Making a distinction between academic and applied knowledge misses the real point about the kind of education needed in a knowledge society and the digital age



It is not sufficient just to teach academic content (applied or not). It is equally important also to enable students to develop the ability to know how to find, analyze, organize and apply information/content within their professional and personal activities, to take responsibility for their own learning, and to be flexible and adaptable to developing new knowledge and skills.



We impart to our students; the applied knowledge which is practical knowledge that is produced by putting academic knowledge into practice.

Good Teaching Practice

Our highly qualified and pedagogically well-trained faculty at the department of Electrical and Computer Engineering focus on the following universally accepted seven principles (anchored in extensive research about teaching, learning, and the student's experience):

The Principles

Encourage Student - Instructor Contact

Encourage Cooperation Among Students

Encourage Active Learning

Give Prompt Feedback

Emphasize Time on Task

Communicate High Expectations

Respect Diverse Talents and Ways of Learning



Complex Engineering Problem – Teaching Philosophy

Complex problem solving (CPS) is a collection of self-regulated psychological processes and activities necessary in dynamic environments to achieve ill-defined goals that cannot be reached by routine actions.

Creative combinations of knowledge and a broad set of strategies are needed. Solutions are often more bricolage than perfect or optimal.

The problem-solving process combines cognitive, emotional, and motivational aspects, particularly in high-stakes situations.

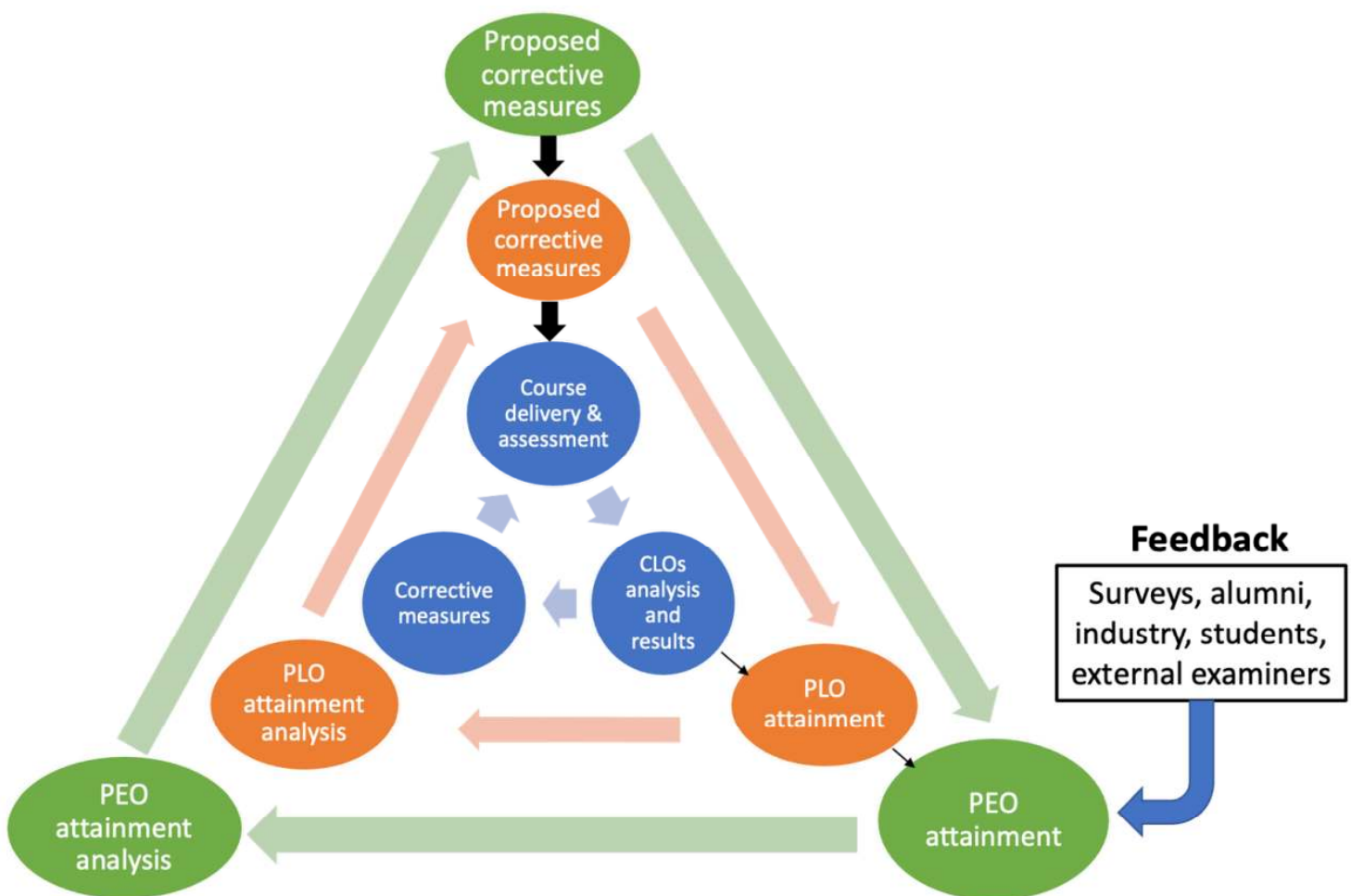
Complex problems usually involve knowledge-rich requirements and collaboration among different persons.

We have designed rigorous mechanism through which each student undergoes CPS throughout his/her study duration



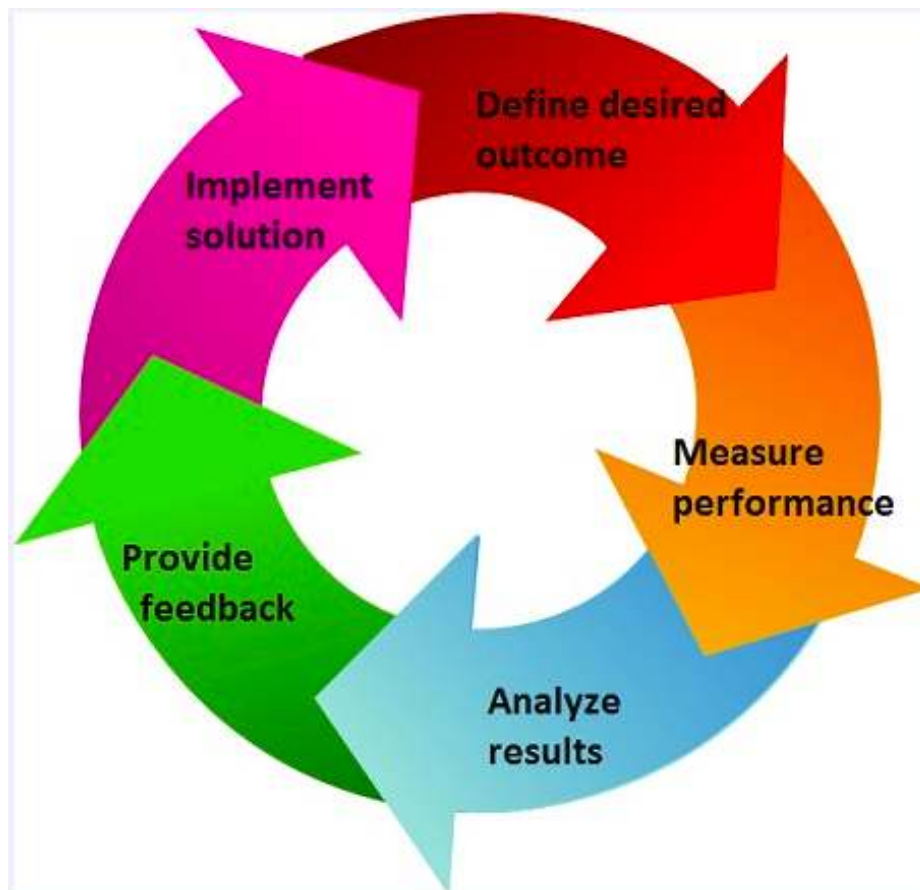
Quality Assurance

Quality enhancement is a holistic approach covering all the processes in a higher education institution, in order to not only serve the students and other stakeholders in expected quality standards but also enhance the quality standards. The Quality Assurance is done by Academic bodies of CUI, Faculty, and PEC as a regulatory body.



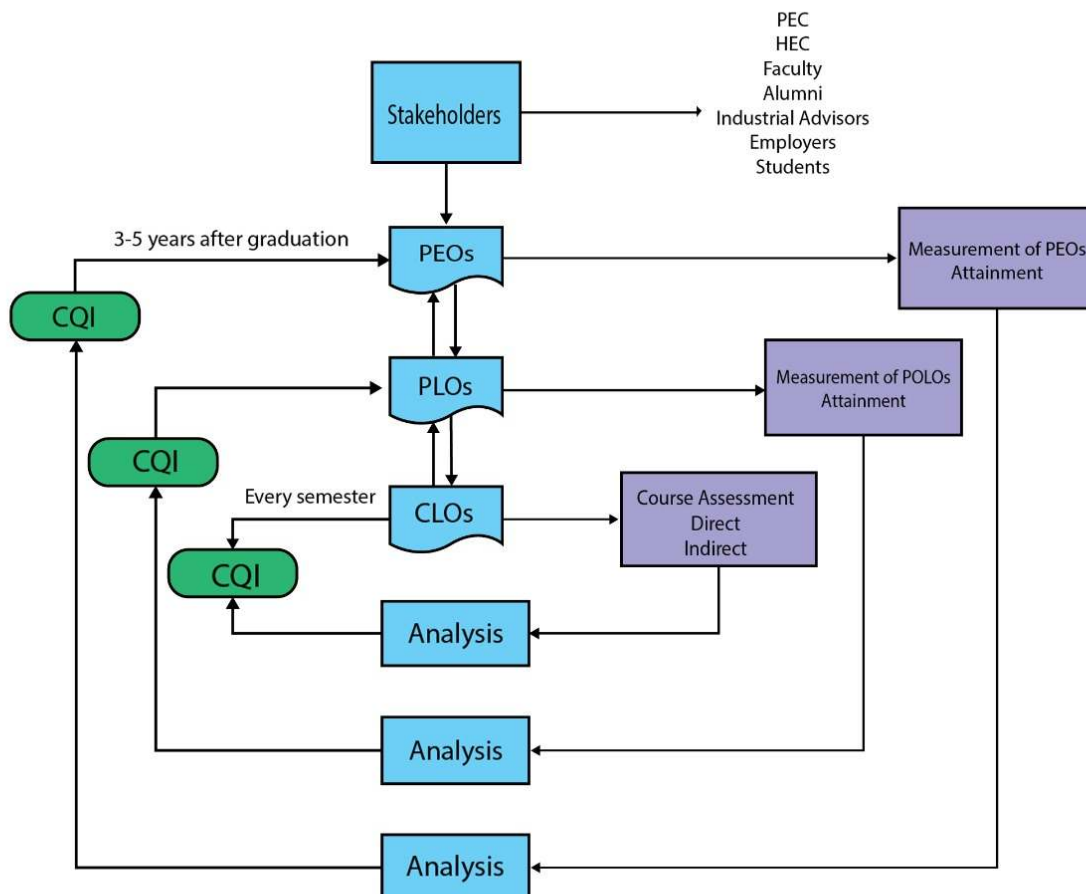
Continuous Quality Improvement

The continuous quality improvement (CQI) mechanism covers the program planning; curriculum development; curriculum and content review; responding to feedback and inputs from stakeholders including industry advisors, students and alumni; tracking the contribution of individual courses to PLOs; tracking outcomes of performance through assessment, including rubrics; reviewing of PEOs and PLOs.



CQI Process

The overall continual quality improvement (CQI) process consists of 3 stages as shown in Figure. Among these three stages the PEO assessment stage takes the longest period to complete its cycle. Once the data for a loop is obtained, it will be processed and the DARC committee will evaluate the results and propose appropriate CQI steps in consultation with the stake holders. The program learning outcome (PLO) attainment for the students is evaluated after each semester which helps improve the quality of the program. The PLO attainment is directly connected with the course learning outcomes (CLOs), where each course comprises of several CLOs and these CLOs are mapped to PLOs.

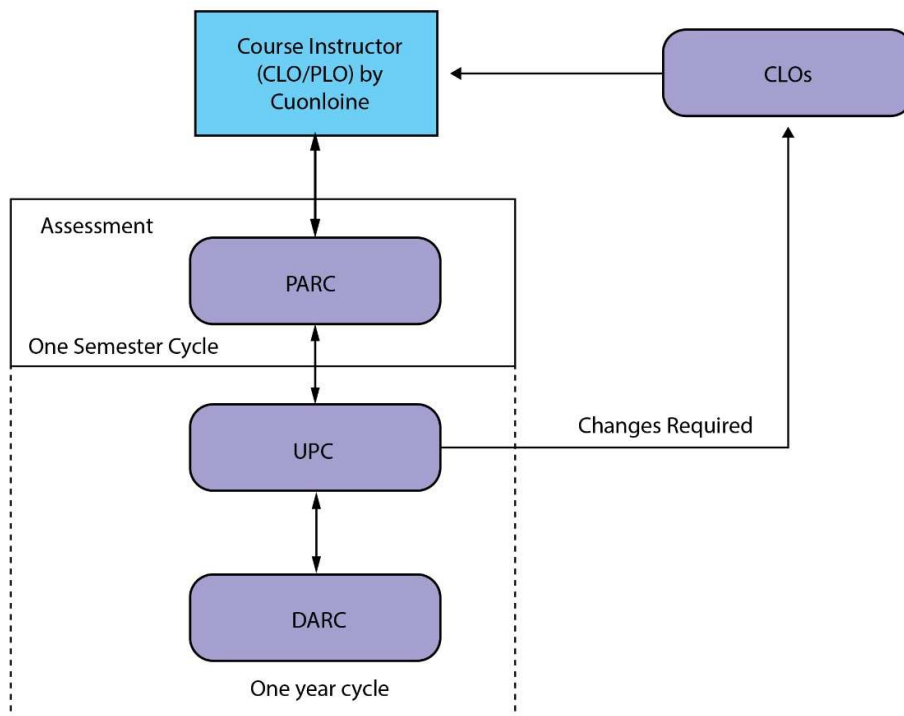


CQI Process

Lahore campus has its own CQI process which operates at the departmental level through its PARC, UPC and DARC. Three main CQI stages for CLO, PLO and PEO assessment are discussed below:

CQI Process for CLO attainment

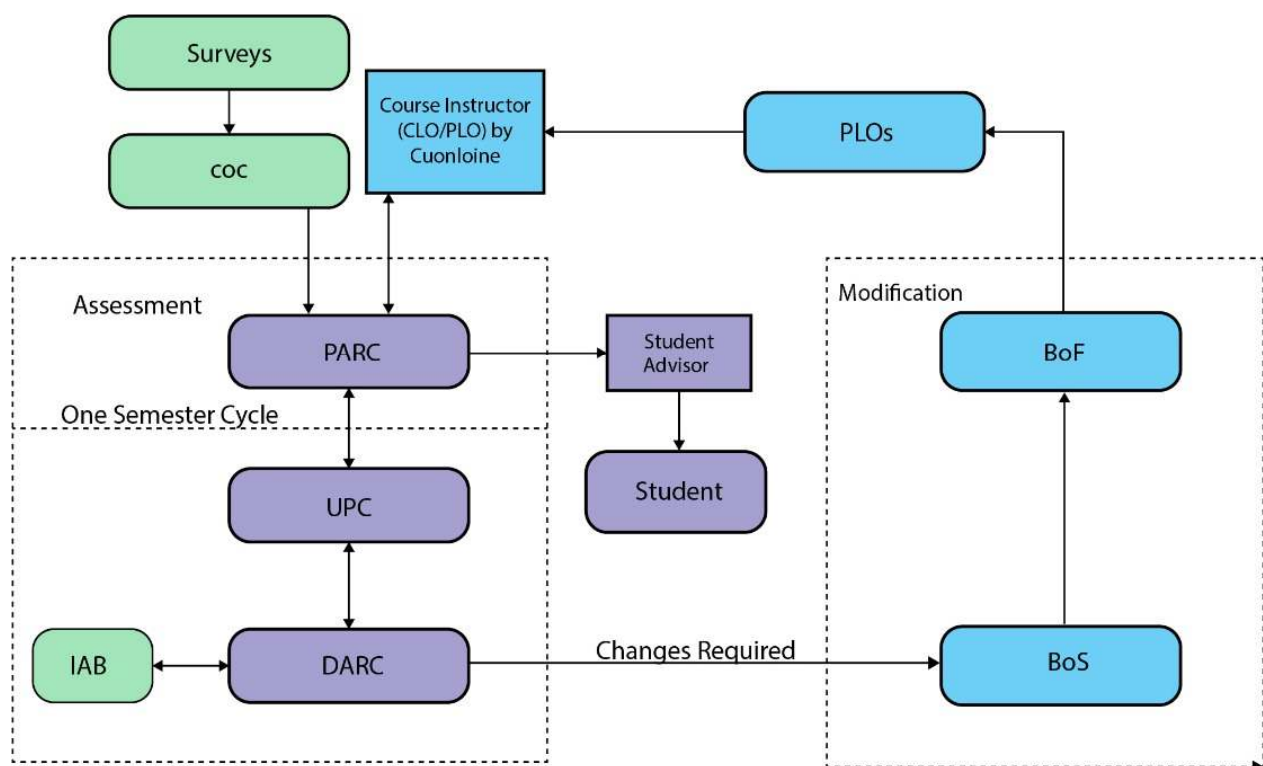
Initially the CLOs for each course were written/suggested as per Bloom Taxonomy and mapped to respective PLOs by course instructors in the departmental meeting. Then these CLOs were presented in UPC and DARC for approval. These approved CLOs are now uploaded in a central depository and CUOnline system was updated as per approved CLOs and their mapping to PLOs. For the CQI cycle, at the end of the semester the course instructor submits the assessment and its evaluation along with course feedback performa providing feedback for the CLOs and their Bloom Taxonomy levels. These feedbacks are then discussed in PARC and then forwarded to UPC for further deliberation/approval. UPC then forwards its recommendation to the course instructor for implementation and also takes DARC into loop for approval. If there are any changes in CLOs, their Bloom Taxonomy levels or their mapping to PLOs, then these changes are incorporated in CUOnline system and CDFs are also updated. Thus, the CLOs with their Bloom Taxonomy levels and mapping to PLOs are continually scrutinized every semester/year.



CQI Process

CQI Process for PLO attainment

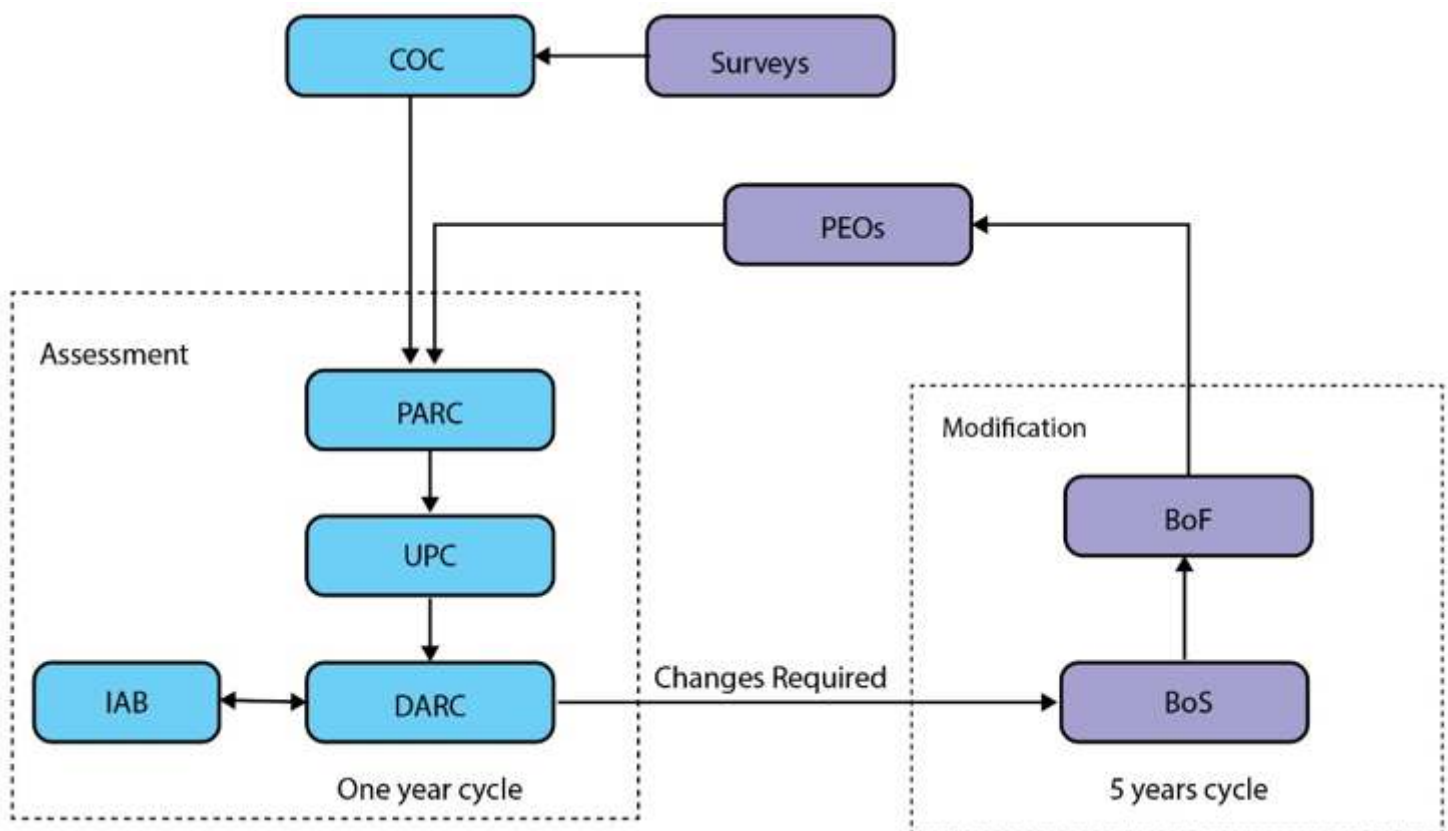
Similar CQI cycle is practiced for PLOs and the course instructor also submits his/her feedback for PLOs which is the direct assessment for PLO attainment. The direct assessment of PLOs is course based and the result of PLO attainment in all courses are added for the final assessment of PLOs in the program. Therefore, the student is informed about his PLO attainment in each course after every semester through batch advisor and the student is advised about his next semester enrolment and cautioned about the PLO attainment in coming semesters. For the indirect assessment of PLO attainment, COC collects the data from graduating students and alumni through online survey forms. This indirect assessment data is also discussed in PARC and presented to UPC & DARC for further deliberation. Both the direct and indirect assessment data is also scrutinized in IAB meeting. The changes, if required will be implemented through BoS and BoF.



CQI Process

CQI Process for PEO attainment

The PEO are accessed indirectly through online alumni and employer survey forms. The data collected from these survey results are discussed in PARC and then forwarded to UPC and DARC for consideration/perusal. The PEO attainment is also discussed in IAB and if any changes are suggested by UPC, DARC or IAB, then these suggestions will be forwarded to BoS and BoF for approval.

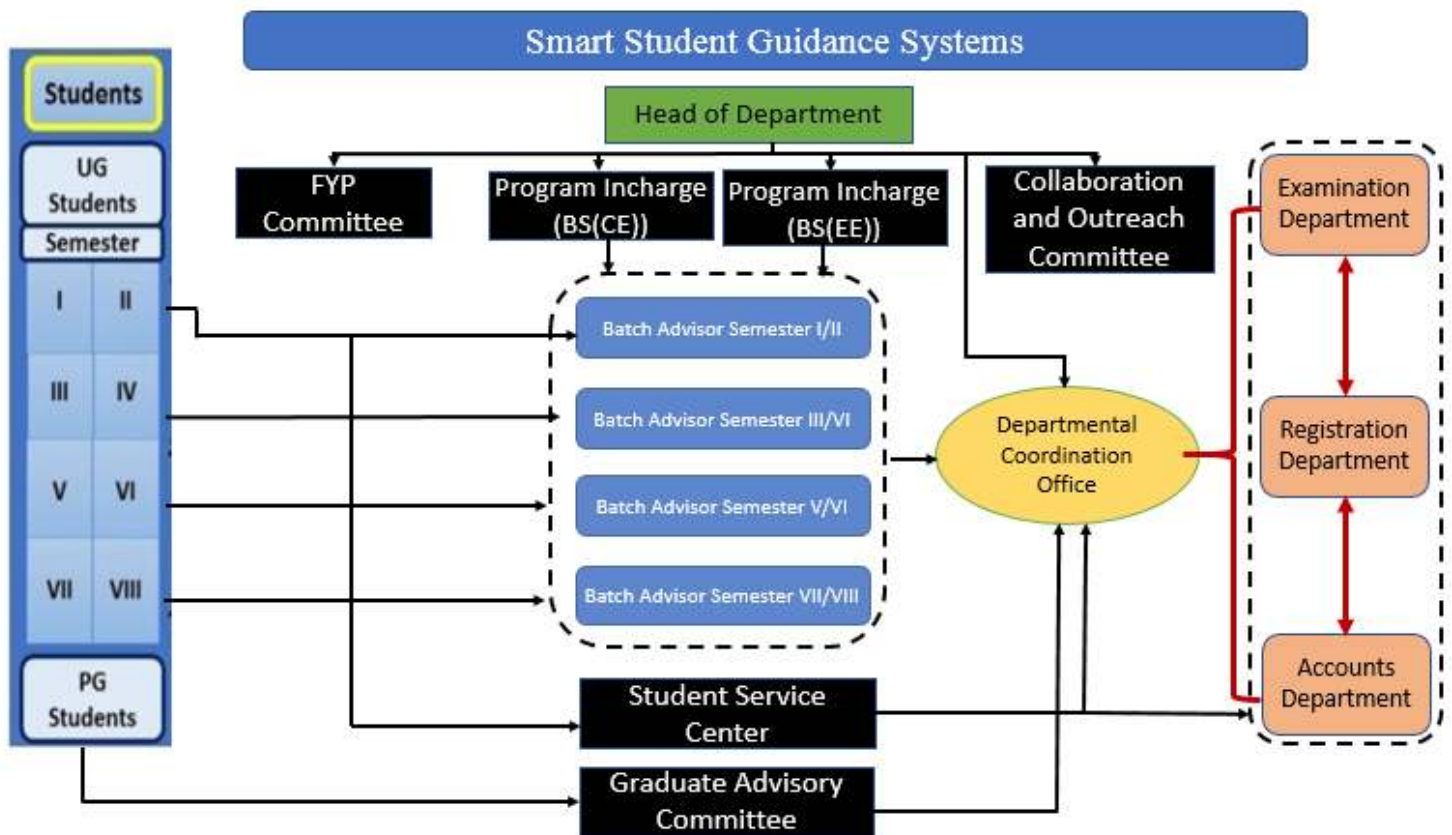


Students' Guidance System (SGS)

- ✓ Students normally face the problems regarding registration of hostel, transport, course(s) or semester, exam coupon, fee installments, clearance after graduation etc.
- ✓ The SGS is particularly designed to cater each problem with maximum possible facilitation to students.
- ✓ Each batch is assigned a batch advisor to discuss course allocations, timetable and other academic related issues.
- ✓ Departmental coordination office, in liaison with Program in charges coordinate with registration department, examination department, hostels, transport section, accounts department and all other allied departments
- ✓ For students to maximize their learning experience through curricular and extra-curricular activities a special committee named Graduate Examination Committee has been constituted. The committee works in close contacts with continuous quality improvement cell, final year design project office and industrial liaison office.
- ✓ Head of Department directly looks after the committee to provide best experience to the students.



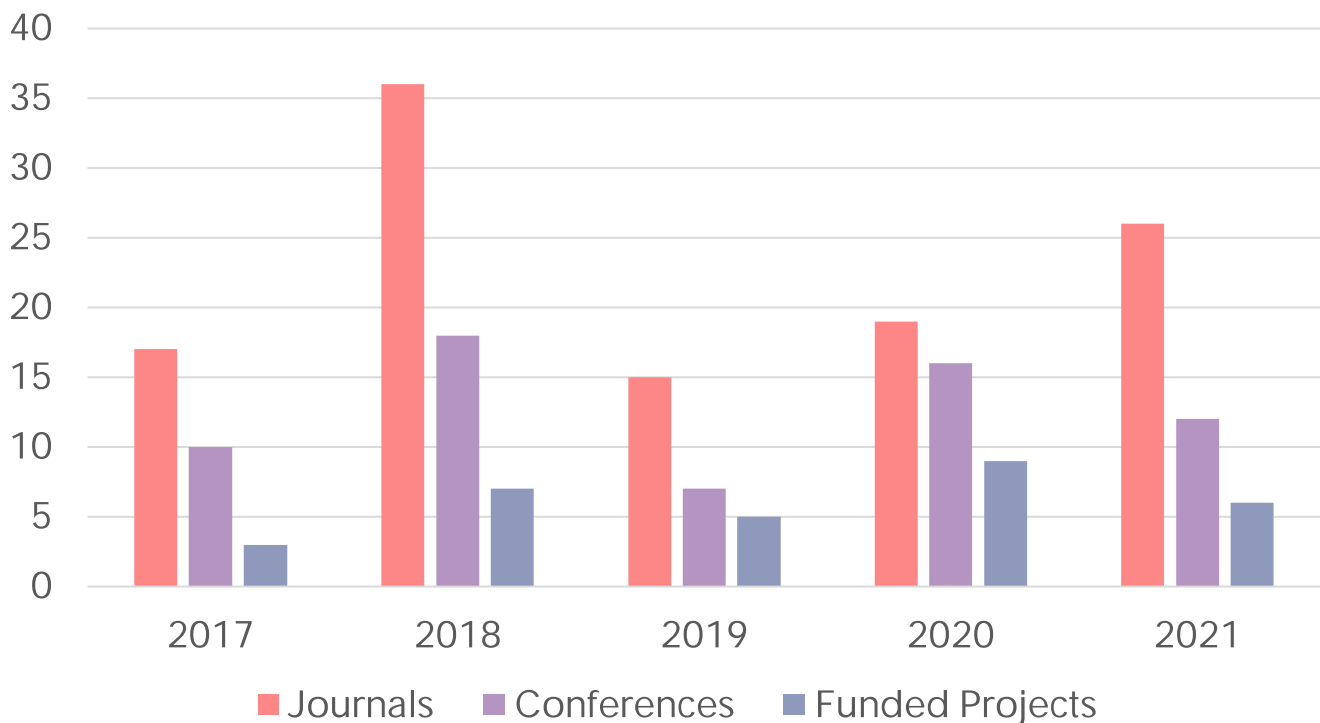
Students Guidance System



Research @ ECE

The ECE department at CUI, Lahore campus nurtures an environment of high-tech research and innovation with its world-class faculty. Our faculty is relentless in their pursuit of excellence: whether that means finding the best solution to a problem, doing something that no one has done before, or simply applying all of their knowledge and skills to the needs of society. The faculty is exploring a number of critical problems mainly in the area of control systems, communications, power, image processing, internet of things and computer networks. The research contributions of the ECE department are on rise and will grow rapidly in the years to come.

Research @ ECE



Funded Research Projects

Research Projects (2021)			
Sr.#	Title of Project	Principal Investigator	Funding Agency
1	IOT based Dynamic Automated Car Parking System	Dr. Imran Ghous	NGIRI
2	An IOT Based Fuzzy Logic Approach For Patient's Health Monitoring System	Dr. Imran Ghous	NGIRI
3	Smart and automated restaurant serving system	Dr. Imran Ghous	NGIRI
4	Detection and Classification of Activities of Daily Living Through EEG	Dr. Ali Nawaz Khan	Ignite NGIRI
5	Solar Powered Battery Charger for plug-in electric vehicle using fourth order resonant converter	Dr. M. Jawad	National Grassroots ICT Research Initiative (NGIRI)
6	Wireless controlled vehicle with robotic arm	Mian Ahmed Yaser	IGNITE ICT R&D Fund

Funded Research Projects

Research Projects (2020)			
Sr.#	Title of Project	Principal Investigator	Funding Agency
1	End to End Framework for Neurological Health Monitoring	Dr. Ali Nawaz Khan	Ignite NGIRI
2	Solar Powered Three-Dimensional Mapping and Dimensional Parameter computer for distance calculations and cloning Architecture Using LIDAR,	Dr. Mirza Tariq Hamayun	Ignite ICT R&D
3	Low Cost Ground Penetrating Radar System For Under Debris Search And Rescue Operations	Dr Asim Ali Khan	HEC-NRPU
4	Permanent Magnet Based Efficient Electric Generator.	Dr. M. Naeem Shehzad	Ignite ICT R&D
5	Smart Residential Building Energy Management Systems	Dr. Abbas Javed	Ignite ICT R&D
6	Autonomous Navigation Robot	Dr. Abbas Javed	Ignite ICT R&D
7	Detection of Seizures in Epileptic Patients to Avoid Sudden Deaths through wearable sensors	Dr. Ali Nawaz Khan	NRPU HEC
8	Design and Development of interactive Mirror with Facial recognition For Aware Home	Dr. Sobia Baig	Ignite ICT R&D
9	Smart Irrigation System using Wireless Sensors Network	Dr. Sobia Baig	Ignite ICT R&D

Research Domains

The Electrical and Computer Engineering department offers its faculty freedom to excel in their research areas by engagement of different groups in research activities. A team of faculty members are grouped together based on their common areas of research to create a better environment for research and innovation. With this approach, the research output of the department has increased significantly, and the quality of research has improved with a great impact. A summary of the research contribution by the department is shown in Table below:

Year	Journals	Conferences	Funded Projects
2017	17	10	3
2018	36	18	7
2019	15	7	5
2020	19	16	9
2021	26	12	6



Research Domains

Communication Systems & Networks

The Communication Systems and Networks (CSN) research group focuses fundamental and applied research in the cutting edge areas of

- Wired and wireless communication
- Communication and cellular networks
- Computer networks
- Wireless sensor networks
- Internet of things (IoT)
- Cyber security
- Smart grid
- Electric vehicles
- Artificial intelligence and machine learning
- Neural networks
- Optimization



Research Domains

Broadband MultiRate Communication Networks

With the influx of the Internet and multimedia applications in our everyday life, the need for a cost effective solution that offers reliable communication with higher data rates, cannot be overlooked. For this purpose, different communication media have been adopted over the years, including the wireless and the wireline media of communication. We can save the extra cost and effort that would go into installing a new network of cables, if we are able to utilize the in place cables, or the "No New Wires" solution for communication networks.

The digital subscriber line (DSL) and the power lines constitute this category of wireline media. Nevertheless, these ubiquitously available wireline media also have their share of problems, including multipath signal propagation, crosstalk and high noise content in the channel. The application of Multi-rate signals processing techniques/ wavelet transforms can reduce costs and improve performance in DSL & Power line communication networks.

Wavelets have been favorably applied in almost all aspects of digital wireless communication systems including data compression, source and channel coding, signal denoising, channel modelling and design of transceivers. Multi-carrier modulation based on Wavelet transform is a novel transmission technique and a promising alternative to the well established OFDM/DMT. The greatest motivation for pursuing W-MCM systems lies in the freedom they provide to communication systems designers. By tailoring the design specifications a wavelet based system that best suits an engineering requirement could be conceived.



Research Domains

Antenna & Radar

The research focus of this group is on

- Electronically Scanned Arrays (Phased Arrays)
- Smart Antennas (includes optimization techniques)
- Antenna Element Design
- Digital Beam Forming
- Wideband Arrays
- Adaptive Arrays
- Radars
- Microwave Imaging

Power, Energy, Robotics & Control (PERC)

PERC (Power, Energy, Robotics and Control) research group is a multidisciplinary group that fosters collaborative research efforts and advance in the areas of efficient and sustainable Power System technologies and application of control systems theory in this area. The group is engaged in developing both fundamental and applied knowledge that is required for the next generation of low-emission, high efficiency power generation system and will also provides assistance to industry in power and energy issues.



Research Domains

Embedded Systems & Computer Architecture

The advancement in process technology has greatly enhanced the design and ability of integrated circuits to implement complex systems on a single chip. This advancement, however, has caused rapid increase in the design complexities of Embedded Systems. These complexities involve the optimized design of embedded systems in terms of area, speed and power consumption. As a result, new methodologies and tools are required to address these design issues. Our research group targets different design, test and verification issues that are associated to Embedded Systems

Wireless Sensor Networks

The rapid change of wireless communications from simple radio communications to more complicated mobile handset with the provision and facility of more useful and attractive services like internet browsing, e-commerce, e-mail and video streaming made the concept of global village a reality. Reliable and fast data transmission over the longer distances at several hundreds of Megabits per second is now becoming more challenging in a developed society.

The existing prevailing wireless environment imposes fundamental restrictions on the capacity and data rate to the



Research Domains

system designer and/ or engineer. Therefore, it has provided incentive and motivation to the wireless researchers and system designers to search for new frontiers towards the user cooperation and spatial dimension to overcome these challenges.

The WSN Research Group develops signal processing algorithms that cover a wide variety of application areas including speech and image processing, wireless sensor networks, analog and digital communications, radar and sonar. Our prime focus is on algorithm development in general, with the applications serving as motivating contexts. Our approach to new algorithms includes some unconventional directions, such as algorithms based on fractal signals, chaotic behaviour in nonlinear dynamical systems in addition to the more conventional areas of signal modelling, quantization, parameter estimation, sampling and signal representation. When developing new algorithms, we often look to nature for inspiration and as a metaphor for new signal processing directions.

Mobile Communications & Networks

The advancements in Mobile Cellular Communications have revolutionized the concepts of connectivity, reliability and ease of communication. Mobile cellular networks have received widespread approval and appreciation from masses. However, better Quality of Service (QoS) and resource management requirements have introduced several new challenges for researchers. These include channel assignment, bandwidth utilization, call queuing and mobility management etc.

Machine Vision & Intelligence

Machine vision and machine intelligence is one of the leading research fields today. This belongs to the automation of systems by merely sensing the environment. The digital world has open ways to build big data. A large amount of such data is in the form of images; and image processing is the technique to discover it in novel ways.



Scholarships

Sr.	Name of Financial Aid/Scholarship	Type of Scholarship/ Financial Aid	Who can Apply	Eligibility Criteria
1	HEC-Ehsaas Need Based Scholarship	Need Based-Scholarship/ Fully funded	For open merit newly enrolled BS level students	Based on Need Assessment
2	PEEF Scholarships	Need Based-Scholarship/ Partially funded	1st semester students only For BS and MS programs	i). HSSC/BS in 2021 with 60% Marks or 2.5 CGPA ii) Domicile Punjab iii) Salary Limit P.M up to 30,000/-
3	KPK-FEF Scholarships	Need Based-Scholarship/ Partially funded	1st semester students only For BS and MS programs	i). HSSC/BS with 60% Marks or 2.5 CGPA ii) Domicile-KPK iii) Salary Limit P.M 50,000/-
4	CUI-Financial Assistance	Partially Funded	All open merit students For BS and MS	Based on Need Assessment
5	Ihsan Trust- Qarz-e-Hasna (Interest Free Loan)	Interest Free Loan/Partially Funded	All open merit students For BS programs	Based on Need Assessment
6	HEC-PM Reimbursement Scheme	Partially funded	New Intake PhD students from selected Areas	Enrolled in Phd/belongs to selected district District list can be seen at HEC Link/at SFAO office
7	Federal/Provincial Benevolent Fund Scholarships	Partially Funded	Students/Children of permanent Govt Employees Federal/Provincial	as per Govt Rules/ For Details visit SFAO office
8	Kinship Concession	Partially Funded	All open merit for BS programs students	Two or more students concurrently studying at CUI



Facilities

Laboratories

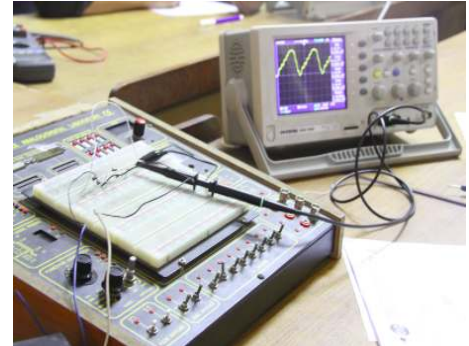
The department has all the requisite laboratories, which are equipped with training systems and instruments. The laboratories have proper and sufficient equipment and space to perform all the experiments as per objectives defined in the syllabi. Every lab has in-charges and associated staff members to help conduct the course. Students get hands on experience and feel of the practical knowledge as an extension of their already studied theory subject



Facilities

Undergraduate Labs

- Data Communication and Internetworking Lab
- Digital Signal Processing Lab
- Control and Instrumentation Lab
- Antenna and Microwave Lab
- Electronics Lab
- Power Electronics/ Industrial Electronics Lab
- Electric Machines Lab
- Final Year Project Lab
- Power Transmission Lab
- Power System Protection Lab
- Digital Logic Design Lab
- RTES/VLSI Lab
- MPI Lab
- Electric circuit Analysis Lab
- Communication Systems Lab



Facilities

Student Services Center

Student Services Center (SSC) is established to facilitate students by one-window operation in lieu of their all academic and non-academic issues. For this purpose, we have developed an online portal, referred to as the Student Facilitation System (SFS); which can be accessed both on and off campus. This portal can be utilized by the students for:



Putting up their queries under the relevant section / department such as registration, accounts, examination, IT, library etc.



Obtaining information about policies, rules and procedures

Checking status of their application/query/problem already uploaded/submitted

Facilities

Infrastructure

Modern up to date Lecture Rooms / Theatres having following facilities:

- Air-conditioners
- Multimedia Projector
- Computer / Internet
- UPS & Generator Back-up
- Conference Hall
- Convocation Venue



Facilities

Playgrounds & Gymnasium

- Playgrounds:
 - Cricket Ground
 - Hockey Ground
 - Football Ground
 - Basketball Court
 - Tennis Court
 - Volleyball Court
 - Table Tennis
- Air-Conditioned Gymnasium



Facilities

Library

- Total 35535 Hard bound Books
- 6178 Engineering Books
- 88 Journals / Magazines
- 10 CS and Engineering Journals
- 23,000 Online Journals
- Bi-annual Book Fairs
- Internet, Computer Facility
- Printing Facility
- Reading Area
- Audio Visual Aids & Equipment



Facilities

Mosque

Central masjid provides a serene facility for prayers including Jumma congregation



Health Center

Health Center has been established near the Girls hostel under the supervision of qualified resident medical officer. It provides first aid and medical facilities to students, staff and faculty members.



Facilities

Cafeteria

A new centralized cafeteria opened in Fall 2018 semester. It has separate halls for students and faculty and can hold up to 1000 persons at any given time. Cafeteria also contains a book shop, a gift shop, fruit/juice shop, a coffee shop, BBQ shop etc.



Facilities

Horticulture

As a matter of national interest, ECE has taken the initiative in line with the Government's vision of 'Clean Green Pakistan' & 'The Billion Tree Tsunami Project'. ECE recently conducted plantation drive and all the faculty and staff participated strongly.

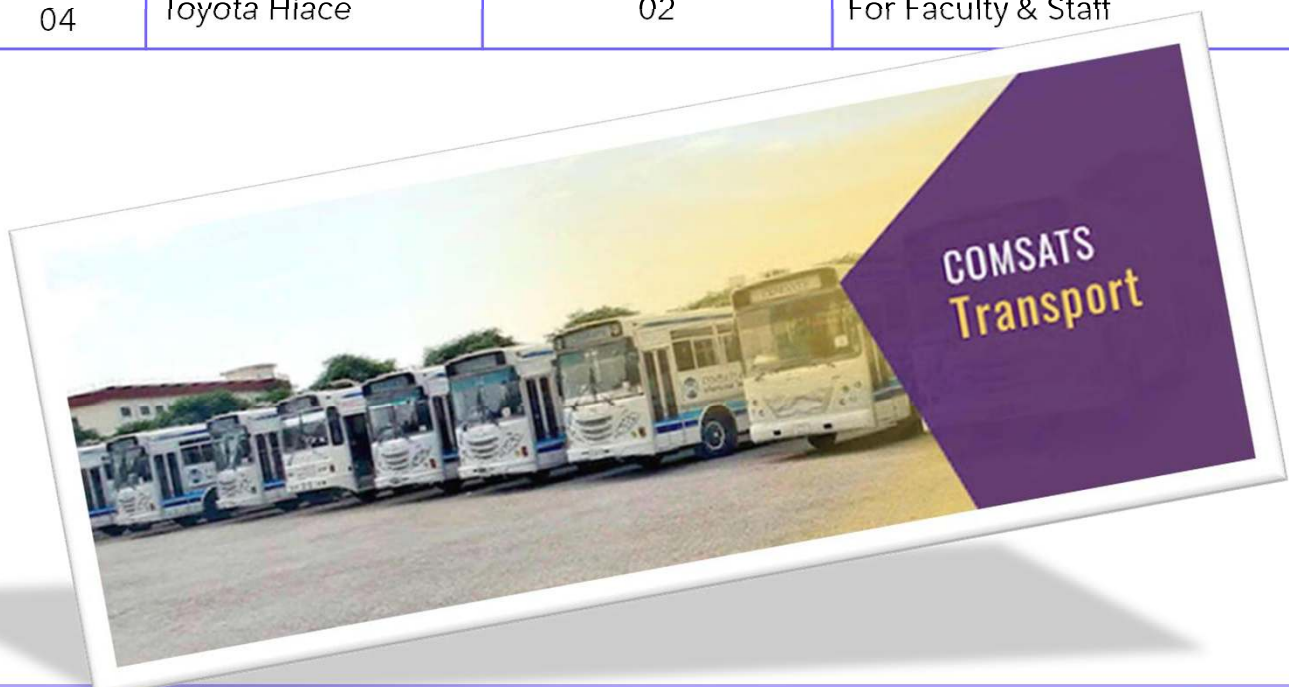


Facilities

Transport Facility

COMSATS University is dedicated to every possible limit to make life for its students as comfortable as possible. Transport service is provided to all the students at a very economical cost. For this purpose, the university has a total of thirteen (13) HINO buses and six (6) coasters. All these vehicles cover Lahore, and the transport is provided three times a day for total of eighteen (16) routes. For emergency purposes, an ambulance is also available. A transport office has been set up for this purpose which makes sure that all students can avail the transport facility as easily as possible.

Sr. No.	Type of Vehicles	Quantity	For Staff/ Students
01	Hino Buses	14	For Students
02	Hino Coasters	06	For Faculty & Staff
03	Ambulance	01	Pool Vehicles
04	Toyota Hiace	02	For Faculty & Staff



Facilities

Hostel Accommodation

At present, CUI Lahore runs 2 hostels for girls' accommodation. All the rooms are fully furnished and equipped with free internet facility as well.

Common rooms, halls, modern kitchens, computer labs, free transportation, health care and many others such facilities make students' stay at hostel as comfortable as possible.

Sr. #	Name of Girls Hostel	Capacity
1	Fatima Jinnah-I	143
2	Safari	241

IT Infrastructure

- 500 Mbps connection through Pakistan Education Research Network (PERN)
- 60 Mbps backup connection from COMSATS Internet Service
- Complete uninterrupted Wi-Fi connectivity throughout the Campus
- Printing / Photocopying facility in Campus

Facilities

Safety, Health & Environment (SHE) Measures

- Fully Functional Horticultural Section
- Emergency Procedures & Trainings
- Safety Signage
- First Aid Kits availability in Labs
- Well Equipped Ambulance & Health Centre
- Fire Alarm System, Smoke Detectors in Labs
- CCTV cameras
- Regular Fumigation in Campus
- Fire Fighting Equipment (Extinguishers, Water Hydrants)
- Water Filtration Facility for Drinking Water & regular testing of Water Quality



Facilities

Safety Policy

As an engineering department of a leading research university, the department of Electrical and Computer engineering is committed to provide highest quality of safety, health and environment in its all activities. The department will ensure that health & safety are given equal consideration with all other aspects of its activities. The department is committed to provide safe & healthy environment, by implementing effective risk control strategies, to all employees and all other persons in its premises including students, visitors and contractors.



Code of Conduct



- Wash Hands Regularly
- No Arms
- Always display ID card
- Switch off cell phone in classrooms
- Abide by dress code
- Avoid political and religious discussions
- Believing in earning reward through Hard Work
- All students should make a habit of saying, “Assalam-wa-Alaikum” to all faculty members / officers / staff
- Maintain Social distance of at least 1
- Wear Masks in Public

Life @ ECE Department

Life at department of Electrical and Computer engineering, CUI Lahore campus is more than an education. For 4 year stay at campus, students explore a lot of curricular/extra-curricular opportunities

Student Societies

There are number of registered student societies in campus which provide students a platform to polish their extra-curricular skills i.e., COMSATS Lahore debating society (CLDS), COMSATS religious society, COMSATS music society, Sports societies etc



Life @ ECE Department

Students' Week

It's a tradition of campus to arrange student's week every semester. The week consists of multiple events hosted by different student societies i.e., debate competitions, Naat competitions, bonfire, photography competitions, sports events etc. to give students a healthy study break.



Life @ ECE Department

Recreational & Industrial Tours

Different recreational/industrial tours are arranged on regular basis for students to boost their exposure, respectively. Collaboration & Outreach Committee along with extra-curricular committee are responsible to arrange such tours throughout the academic term



Life @ ECE Department

Workshops & Seminars

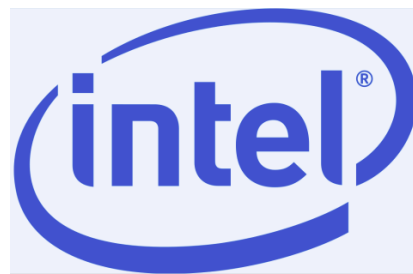
Workshops & Seminars are frequently arranged and students are highly encouraged to participate in such events. A few of these events are:

- IET - DICE 2020 (CUI, Lahore Campus)
- IET - DICE 2019 (CUI, Lahore Campus)
- SOFTEC (FAST, Lahore)
- IEEE Mini POCO (Lahore)
- IEEE PSYWSC 2018 (PIEAS, Islamabad)
- IEEE WIE Lead 2018 (CUI, Lahore)
- FIT (CUI, Islamabad)



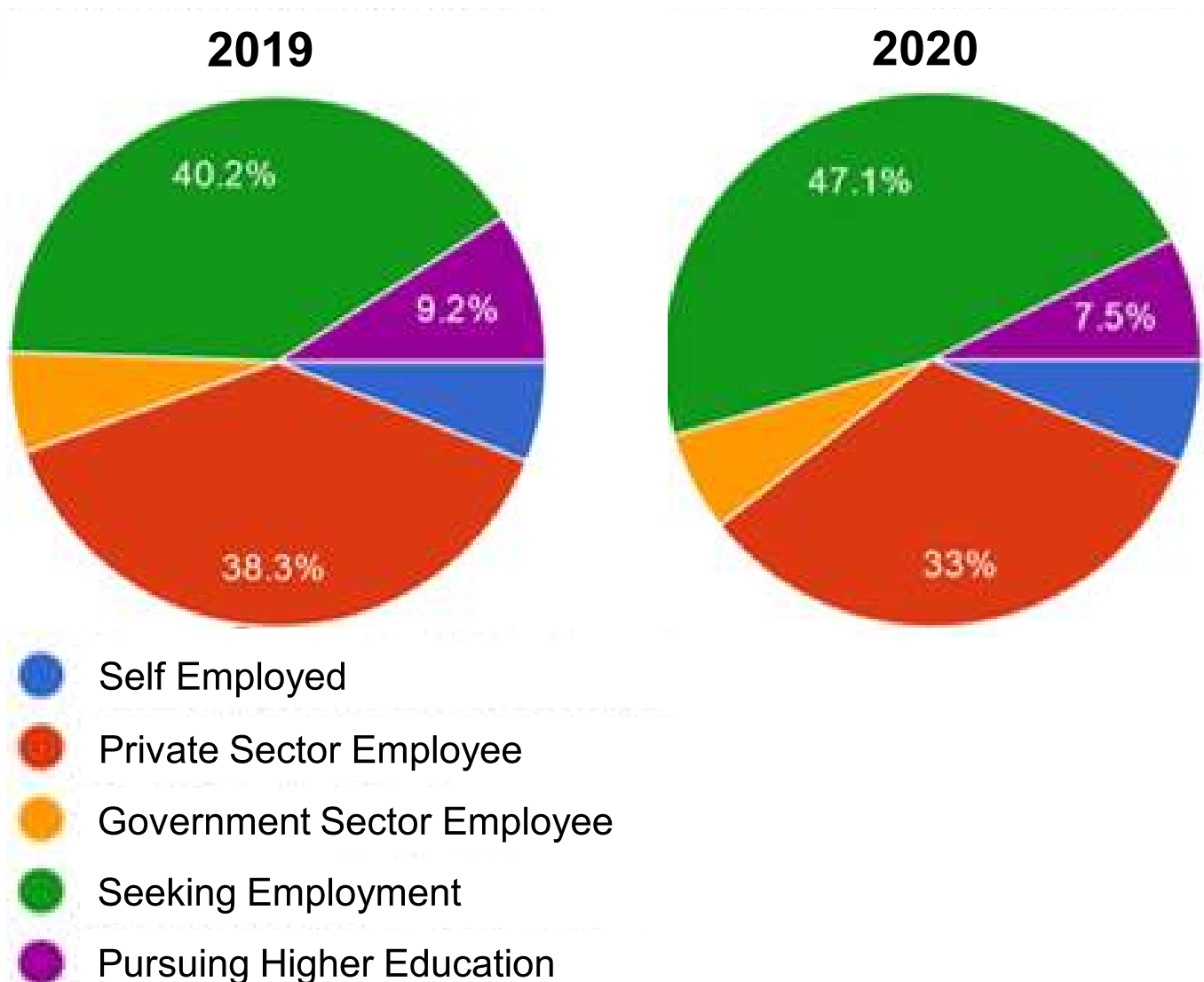
Our Alumni

Over the years, our Alumni have proven their skills not only in Pakistan's industry but abroad as well. A vast number of Alumni are currently working in various Forbes 500 companies.

The logo for Siemens, featuring the word "SIEMENS" in a bold, teal, sans-serif font.

Alumni Employment Status

ECE department regularly keeps in touch with the graduated students through surveys and employer feedback. Even during the pandemic, our graduates have had successfully secured jobs in both private and government sector. Some of these students also opted for entrepreneurship which goes in line with the department's vision and future goals



Future Plans

The department is motivated to continuously improve its strengths with new initiatives. Some of which are,

- ✓ **Entrepreneurship:** The department aims to provide both entrepreneurship skills and opportunities in terms of loans for small scale business start-ups (SSBS). It will enable students to start earning at a very early stage after graduation and become job providers rather than job seekers.
- ✓ **Industry-Academia Linkages:** The department aims to strengthen its relations with industry using bilateral benefit approach. The department will offer services to boost up R&D of industries in return of funded projects, internships and training programs at different organizations.
- ✓ **New Programs:** The department plans to start new programs based on emerging technologies and has completed fundamental working for start of programs i.e., energy systems engineering, data science engineering, robotics and control etc



Important Contacts

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