

Department of Electrical Engineering

Keeping in view the importance and realizing the impact of the different branches of Electrical Engineering on the socio-economic growth of our country, Sarhad University decided to launch Electrical Engineering Degree Program. The Degree program is so designed that it provides an opportunity to the enrolled students to select and opt for studying the courses either in Power Engineering Group, Telecommunication Engineering Group or Electronics Engineering Group, depending upon the aptitude of the students which they may develop during their initial courses of the study, and / or most importantly, based on the market demand for a particular group of Electrical Engineering. During the first two years (4 Semesters) of the four year Degree program (eight Semesters), courses are offered which cover the common fundamentals of all the major fields in Electrical Engineering. However, in the next two years, emphasis is laid on specialized option with a view to enhance career prospects. For the last two years, courses are carefully designed in terms of Power, Electronics and Communication Groups of Electrical Engineering enabling students for better understanding of their areas of interest. The Bachelor Program in Electrical Engineering is accredited by the Pakistan Engineering Council.

Mission

To produce graduate equipped with state-of-the-art education, in-depth knowledge and relevant skills to foster research and development activities, expose them to the complete cycle of research process and emphasize on the precept of how innovation blended with creativity can result in viable and meaningful research outcomes

Program Offered: Bachelor of Science in Electrical Engineering

Faculty Members, Department of Electrical Engineering

Engr. Dr. M. Abid Saeed	Head of Department	Ph.D Electrical Engineering (Control System), Shanghai Jiao Tong University, China
Engr. Dr. Obaid Ur Rehman	Professor	Ph.D Electrical Engineering, Zhejiang University, China
Dr. Azhar Ali	Associate Professor	Ph.D Mathematics, Islamia College University, Peshawar
Engr. Muhammad Iqbal Khan	Coordinator	MS Electrical Engineering, Sarhad University, Peshawar
Engr. Shahid Alam	Assistant Professor	MS Electrical Engineering, UET, Peshawar
Engr. Saleh Lutfullah Kakakhel	Assistant Professor	MS Electrical Engineering, Sarhad University, Peshawar
Engr. Mohsin Iqbal	Assistant Professor	MS Electrical Engineering, Sarhad University, Peshawar
Engr. Noman Muslim	Lecturer	MS Electrical Engineering, Sarhad University, Peshawar
Engr. Iftikhar Khan	Lecturer	MS Electrical Engineering, CECOS University, Peshawar
Engr. Syed Dildar Hussain Shah	Lecturer	MS Electrical Engineering, Sarhad University, Peshawar
Engr. Syed Noman Shah	Lab Engineer	BSc Electrical Engineering, City University, Peshawar

Bachelor of Science in Electrical Engineering

Program Code	240
Number of Courses	40
Credit Hours	134

Minimum Duration	8 Semesters, 4 Years
Maximum Duration	14 Semesters, 7 Years
Minimum CGPA Required To Earn Degree	2.00

Eligibility:

- Candidates who have passed intermediate (Pre-Engineering/ *Pre-Medical/ *Computer Science) from a recognized BISE in Pakistan with at least 60% unadjusted marks.
*The candidates with an intermediate Pre-Medical or Computer Science background have to study an additional course of remedial Mathematics and Chemistry, respectively, during the initial 1-2 Semesters, in accordance with PEC guidelines.
- Candidates possessing B-Tech (Hons) in the relevant field are also eligible for admission against the 2% reserved seats on open merit
- Candidates possessing 3-years Post-Matric Diploma of Associate Engineer in the relevant technology with at least 60% unadjusted marks.
- All candidates are required to pass an entry test conducted by NTS / ETEA or any registered testing agency or University with at least 33% cumulative score.

Foreign candidates need to pass entry/apptitude test conducted by the University. For further details, see clause 4 in Admission Process.

Program Educational Objectives (PEOs) :

The Department of Electrical Engineering at Sarhad University Peshawar has adopted the following three program educational objectives (PEOs). All of the PEOs have been devised keeping in view the vision and mission of the university and the professional requirements in the domain of Electrical Engineering. PEO's are aligned with United Nation SDG's.

- PEO-1: Technical Proficiency and Problem Solving:** Graduates will possess the knowledge to investigate, analyze, and solve to provide innovative solutions for complex engineering problems.
- PEO-2: Leadership and Societal Impact:** Graduates will be equipped to serve and lead for the socio-economic and environmental development of the country.
- PEO-3: Lifelong Learning and Professional Development:** Graduates will demonstrate a lifelong learning attitude, entrepreneurial and soft skills with a strong commitment to ethical values.

Outcome Based Education (OBE) System :

OBE is an approach of curriculum design and teaching that focuses on what students should be able to do (attain) at the end of course/ program. The Undergraduate curriculum at Department of Electrical Engineering, Sarhad University was transformed into adopting OBE from Spring 2018 in

accordance with requirements from Pakistan Engineering Council Accreditation Manual 2019 and to satisfy the requirements of Washington Accord 2013. The framework for OBE in the Electrical Engineering Department and the process control mechanism consists of four different phases i.e. design, assess, analyze and review. For each of the phases Program Educational Objectives (PEOs), Program Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs), are defined.

Scheme of Studies:

1st Semester

Course Code	Course Title	Cr. Hrs.17
ENG 100	Functional English	3-0
MA 111	Calculus and Analytical Geometry	3-0
EE 111	Linear Circuit Analysis	3-0
EE 111L	Linear Circuit Analysis Lab	0-1
CS 100	Applications of ICT	2-0
CS 100L	Applications of ICT Lab	0-1
ME 221L	Engineering Drawing & Autocad	0-1
GS 121	Applied Physics	2-0
GS 121L	Applied Physics Lab	0-1
CH 103	Chemistry (For the students of FCS background only)	2-1
QT 100	Quran-e-Majeed Teaching (Audit Basis)	2-0

2nd Semester

Course Code	Course Title	Cr. Hrs.17
MA 211	Differential Equations	3-0
MA 221	Numerical Analysis	3-0
EE 224L	Workshop Practice	0-1
GE 109	Ideology and Constitution of Pakistan (Pakistan Studies)	2-0
CS 121	Computer Programming	3-0
CS 121L	Computer Programming Lab	0-1
EE121	Electronics Devices and Circuits	3-0
EE121L	Electronics Devices and Circuits Lab	0-1

3rd Semester

Course Code	Course Title	Cr. Hrs.18
MA 240	Complex Variables and Transforms	3-0
ECO 222	Engineering Economics	2-0
EE 122	Digital Logic Design	3-0
EE 122L	Digital Logic Design Lab	0-1
CS 245	Data Structures and Algorithms	3-0
CS 245L	Data Structures and Algorithm Lab	0-1
ME 200	Occupation Health and Safety	1-0
EE 212	Electrical Network Analysis	3-0
EE 212L	Electrical Network Analysis Lab	0-1

4th Semester

Course Code	Course Title	Cr. Hrs.17
ENG 311	Communication & Presentation Skills	2-0
MA 121	Applied Linear Algebra	3-0
GS 123/240	Islamic Studies/ Value, Ethics & Society (for Non-Muslims)	2-0
EE 314	Probability Methods in Engineering	3-0
EE 213	Signals & Systems	3-0
EE 213L	Signals & Systems Lab	0-1
EE 323	Electromagnetic Field Theory	3-0

5th Semester

Course Code	Course Title	Cr. Hrs.17
EE 211	Electrical Machines	3-0
EE 211L	Electrical Machines Lab	0-1
EE 316	Microprocessor Architecture & Assembly Language	3-0
EE 316L	Microprocessor Architecture & Assembly Language Lab	0-1
EE 221	Communication Systems	3-0
EE 221L	Communication Systems Lab	0-1
GE 303	Civics and Community Engagement	1-1
CE 102	Hydraulics	3-0

6th Semester

Course Code	Course Title	Cr. Hrs.16
ENG 355	Expository Writing	3-0
EE 321	Linear Control Systems	3-0
EE 321L	Linear Control Systems Lab	0-1
EE 363	Power Distribution and Utilization	3-0
EE 363L	Power Distribution and Utilization Lab	0-1
MGT 372	Project Management	2-0
	Elective-I	3-0

7th Semester

Course Code	Course Title	Cr. Hrs.17
GS 422	Professional Ethics	3-0
	Elective-II	3-1
	Elective-III	3-0
	Elective-IV	3-1
RES 480	Final Year Project-I	0-3

8th Semester

Course Code	Course Title	Cr. Hrs.15
GS 422	Entrepreneurship	2-0
EE 426	Artificial Intelligence	3-0
EE 453	Electrical Power Transmission	3-0
	Elective-V	3-1
RES 480	Final Year Project-II	0-3

Electives:



Power Track		
Course Code	Course Title	Cr. Hrs.
EE 334	Industrial Electronics	3-0
EE 334L	Industrial Electronics (Lab)	0-1
EE 326	Electrical Machine Analysis and Design	3-0
EE 326L	Electrical Machine Analysis and Design (Lab)	0-1
EE 410	Power System Protection	3-0
EE 410L	Power System Protection (Lab)	0-1
EE 423	Advanced Electrical Machines	3-0
EE 423L	Advanced Electrical Machines (Lab)	0-1
EE 453	Electrical Power Transmission	3-0
EE 453L	Electrical Power Transmission (Lab)	0-1
EE 417	Power Electronics	3-0
EE 417L	Power Electronics (Lab)	0-1
EE 466	PLC and Industrial Drives	3-0
EE 466L	PLC and Industrial Drives (Lab)	0-1
EE 431	Power System Operation & Control	3-0
EE 310	Power Generation	3-0
EE 451	Power Economics & Management	3-0
EE 452	Renewable Energy Systems	3-0
EE 454	Fundamentals of High Voltage Engg.	3-0
EE 412	Digital Control Systems	3-0
EE 461	Integrated Electronic Circuit	3-0
EE 435	Power Generation & Utilization	3-0
EE 308	Power System Analysis	3-0
EE 308L	Power System Analysis (Lab)	0-1
EE 322	Introduction to Power Engineering	3-0
Communication Track		
Course Code	Course Title	Cr. Hrs.
COM 308	Wave Propagation & Antenna	3-0
COM 308L	Wave Propagation & Antenna (Lab)	0-1
EE 439	Microwave Engineering	3-0
EE 439L	Microwave Engineering (Lab)	0-1
EE 338	Digital Communication	3-0
EE 338L	Digital Communication (Lab)	0-1
EE 429	Radar Systems & Television	3-0
EE 429L	Radar Systems & Television (Lab)	0-1
EE 441	Multimedia Communication	3-0
EE 441L	Multimedia Communication (Lab)	0-1
COM 385	Telecom Transmission and Switching	3-0
EE 426	Artificial Intelligence	3-0
COM 408	Optical Fiber Communication	3-0
COM 470	Satellite Communication Systems	3-0
COM 350	Mobile Communication	3-0
EE 425	Electromagnetic Compatibility	3-0

Electronics Track		
Course Code	Course Title	Cr. Hrs.15/17
EE 431	VLSI Design	3-0
EE 431L	VLSI Design (Lab)	0-1
EE 401	Digital System Design	3-0
EE 401L	Digital System Design (Lab)	0-1
EE 334	Industrial Electronics	3-0
EE 334L	Industrial Electronics (Lab)	0-1
EE 429	Radar Systems & Television	3-0
EE 429L	Radar Systems & Television (Lab)	0-1
EE 435	Digital Electronics	3-0
EE 435L	Digital Electronics (Lab)	0-1
EE 433	Industrial Process Control	3-0
EE 433L	Industrial Process Control (Lab)	0-1
EE 441	Digital Instrumentation	3-0
EE 442	Digital Instrumentation (Lab)	0-1
EE 439	Microwave Engineering	3-0
EE 439L	Microwave Engineering (Lab)	0-1
COM 326	Computer Communication Networks	3-0
COM 326L	Computer Communication Networks (Lab)	0-1
EE 480	Solid State Devices	3-0
EE 480L	Solid State Devices (Lab)	0-1
EE 322	Introduction to Power Engineering	3-0
EE 417	Power Electronics	3-0
EE 417L	Power Electronics (Lab)	0-1
COM 308	Wave Propagation & Antenna	3-0
COM 308L	Wave Propagation & Antenna (Lab)	0-1
EE 427	Digital Image Processing	3-0
EE 412	Digital Control Systems	3-0
EE 428	Computer Vision	3-0
EE 314	Opto Electronics	3-0
COM 470	Satellite Communication Systems	3-0
EE 425	Electromagnetic Compatibility	3-0
EE 327	Advanced Electronics	3-0
EE 347	Transmission Lines and Waveguides	3-0
EE 347L	Transmission Lines and Waveguides (Lab)	0-1
EE 339	Electronics Circuit Design	3-0
EE 339L	Electronics Circuit Design (Lab)	0-1

The facility for teaching of any of the elective course will be arranged only if reasonable number of students opt for.

Program Learning Outcomes (PLOs)

- PLO-01 Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and engineering specialization to the solution of complex engineering problems. (WK-1-WK-4)
- PLO-02 Problem Analysis:** Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK-1-WK-4)
- PLO-03 Design/Development of Solution:** An ability to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK-5)
- PLO-04 Investigation:** Conduct investigation of complex engineering problems using research-based knowledge and research methods, including design of experiments, analysis, and interpretation of data, and synthesis of information to provide valid conclusions. (WK-8)
- PLO-05 Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modeling, to complex Engineering problems, with an understanding of the limitations. (WK-2 and WK-6)
- PLO-06 The Engineer and the World:** Analyze and evaluate sustainable development impacts to society, the economy, sustainability, health and safety, legal frameworks, and the environment while solving complex engineering problems. (WK-1, WK-5, and WK-7)
- PLO-07 Ethics:** Apply ethical principles and commit to professional ethics and norms of engineering practice and adhere to relevant National & International laws. Demonstrate an understanding of the need for diversity and inclusion. (WK-9)
- PLO-08 Individual and Collaborative Team Work:** Function effectively as an individual, and as a members or leader in diverse and inclusive teams and in multidisciplinary, face-to-face, remote and distributed settings.
- PLO-09 Communication:** Communicate effectively and inclusively on complex engineering activities with the engineering community and with society at

large, such as being able to comprehend and write effective reports and design documentation, and make effective presentations, taking into account cultural, language, and learning differences. (WK-1 and WK-9)

- PLO-10 Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member & leader in a team, to manage projects in multidisciplinary environments. (WK-2 and WK-5)

- PLO-11 Life-Long Learning:** Recognize the need for, and have the preparation and ability for
- i) independent and life-long learning
 - ii) adaptability to new and emerging technologies
 - iii) critical thinking in the broadest context of technological change. (WK-8 and WK-9)

Hierarchical Model of Outcomes at SUIT

Vision and Mission Statements of SUIT/Faculty/Department



Program Educational Objectives (PEOs)



Program Learning Outcomes (PLOs)



Course Learning Outcomes (CLOs)