

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. The first two years (4 Semesters) of the four years 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 understating of their areas of interest. The Bachelor Program in Electrical Engineering is accredited by the Pakistan Engineering Council.

Program Offered:

Bachelor of Electrical Engineering

Vision

To educate the students in both theory and practice of core Electrical Engineering areas. The program focus is to impart knowledge which will allow the students to solve the problems of their community and make them useful persons. The offered program provides vast potentials at the frontier of knowledge and innovation.

Mission

To produce graduates 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.

Bachelor of Electrical Engineering

Minimum Duration : 8 Semesters, 4 Years
 Maximum Duration : 14 Semesters, 7 Years
 Minimum CGPA required to earn degree 2.00

Program Code 071
 Number of Courses 43
 Credit Hours 133

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 professionals requirements in the domain of Electrical Engineering.

PEO-1 : To produce graduate having the ability to investigate complex engineering problems using state of the art practices employed in electrical engineering and advise efficient and effective solutions.

PEO-2 : To prepare graduates for managing engineering ventures and demonstrate strong interpersonal skills towards an effective team work and have strong leadership qualities.

PEO-3 : To incline the graduates towards lifelong learning, demonstrate high professional ethical values, and continue positively towards better society.

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 2014 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.

Eligibility :

- I. Candidates who have passed Intermediate (Pre-Engineering Examination) with the subjects of Mathematics, Physics, and Chemistry from a recognized BISE in Pakistan or any other equivalent examination with at least 60% unadjusted marks.
- II. Candidates possessing 3-Year Post-Matric Diploma of Associate Engineer in the relevant Technology with at least 60% unadjusted marks.

All candidates are required to appear in ETEA/centralized entry test.

Foreign students need to pass entry/aptitude test conducted by the University. For further details please see clause 4 in Rules & Regulations.

SEMESTER ONE	Course Code	Course Title	Cr. Hrs. 18
	MA111	Calculus and Analytical Geometry	3-0
	CS111	Introduction to Computing	1-0
	CS111L	Introduction to Computing (Lab)	0-1
	EE111	Linear Circuit Analysis	3-0
	EE111L	Linear Circuit Analysis (Lab)	0-1
	EE107	Electricity and Magnetism	3-0
	EE107L	Electricity and Magnetism (Lab)	0-1
	CE102	Hydraulics	3-0
	GS123	Islamic Studies or Society (for Non Muslims) in lieu of Islamic Studies	2-0
SEMESTER TWO	Course Code	Course Title	Cr. Hrs. 18
	MA 121	Applied Linear Algebra	3-0
	CS121	Programming Fundamentals	2-0
	CS121L	Programming Fundamentals (Lab)	0-1
	EE121	Electronic Devices and Circuits	3-0
	EE121L	Electronic Devices and Circuits (Lab)	0-1
	EE122	Digital Logic Design	3-0
	EE122L	Digital Logic Design (Lab)	0-1
	ENG121	Functional English	2-0
	GS121	Pakistan Studies	2-0

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Program Learning Outcomes (PLOs) :

- PLO-01 **Engineering Knowledge** :An ability to apply knowledge of mathematics , science , engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- PLO-02 **Problem Analysis**:An ability to identify, formulate , research literature , and analyze complex engineering problem s reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- PLO-03 **Design/Development of Solutions**: 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.
- PLO-04 **Investigation**:An ability to investigate complex engineering problems in a methodical way including literature survey, design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to derive valid conclusions.
- PLO-05 **Modern Tool Usage** : An ability to create, select and apply appropriate techniques, resources ,and modern engineering and IT tools,including prediction and modeling, to complex engineering activities, withan understanding of the limitations.
- PLO-06 **The Engineer and Society** : An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solution to complex engineering problems.

SEMESTER THREE

Course Code	Course Title	Cr. Hrs. 16
MA211	Differential Equations	3-0
CS221	Data Structures and Algorithms (Pre-req:CS-121)	2-0
CS221L	Data Structures and Algorithms (Lab) (Pre- req:CS-121)	0-1
EE211	Electrical Machines (Pre-req:EE-111)	3-0
EE211L	Electrical Machines (Lab) (Pre-req:EE-111)	0-1
EE212	Electrical Network Analysis (Pre-req:EE-111)	3-0
EE212L	Electrical Network Analysis (Lab) (Pre- req:EE-111)	0-1
EE224	Workshop Practice	1-0
EE224L	Workshop Practice (Lab)	0-1

SEMESTER FOUR

Course Code	Course Title	Cr. Hrs. 18
MA221	Numerical Analysis	3-0
EE213	Signals & Systems	3-0
EE213L	Signals & Systems (Lab)	0-1
MA240	Complex Variables and Transforms	3-0
ME221	Engg Drawing and Autocad	2-0
ME221L	Engg Drawing and Autocad (Lab)	0-1
ME311	Applied Thermodynamics	3-0
ENG311	Communication & Presentation Skills	2-0

SEMESTER FIVE

Course Code	Course Title	Cr. Hrs. 19
EE323	Electromagnetic Field Theory	3-0
EE221	Communication Systems	3-0
EE221L	Communication Systems (Lab)	0-1
EE311	Microprocessor System(Pre- req:EE-122)	3-0
EE311L	Microprocessor System (Lab)	0-1
EE222	Instrumentation & Measurements	3-0
EE222L	Instrumentation & Measurements (Lab)	0-1
EE436	Power Transmission & Distribution	3-0
EE436L	Power Transmission & Distribution (Lab)	0-1

SEMESTER SIX

Course Code	Course Title	Cr. Hrs. 16
EE321	Linear Control Systems (Pre-req: MA-211)	3-0
EE 321L	Linear Control Systems (Lab) (Pre-req: MA-211)	0-1
EE 314	Probability Methods in Engineering	3-0
EE XYZ	Organizational Behaviour	3-0
	Elective I	3-0
	Elective II	3-0

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- PLO-07 **Environment and Sustainability** : An ability to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
- PLO-08 **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
- PLO-09 **Individual and Team Work**:An ability to work effectively , as an individual or in a team, on multi faceted and / or multi disciplinary settings.
- PLO-10 **Communication**: An ability to communicate effectively, orally as well as in writing ,on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective report sand design documentation , make effective presentations ,and give and receive clear instructions.
- PLO-11 **ProjectManagement**: An ability to demonstrate management skills and apply engineering principles to one's own work, as a member and / or leader in a team,to manage projects in a multi disciplinary environment.
- PLO-12 **Lifelong Learning**:An ability to recognize importance of , and pursue life long learning in the broader context of innovation and technological developments.

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

SEMESTER SEVEN

Course Code	Course Title	Cr. Hrs.	16
MGT411	Engineering Economics and Management	3-0	
ENG411	Technical Report Writing	2-0	
	Elective-III	3-1	
	Elective-IV	3-1	
RES480	Project Part-I	0-3	

SEMESTER EIGHT

Course Code	Course Title	Cr. Hrs.	12
GS421	Professional Ethics	2-0	
	Elective-V	3-1	
	Elective-VI	3-0	
RES480	Project Part-II	0-3	

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)

Electives

Power Track

Course Code	Course Title	Cr. Hrs.
EE334	Industrial Electronics	3-0
EE334L	Industrial Electronics (Lab)	0-1
EE326	Electrical Machine Analysis and Design	3-0
EE326L	Electrical Machine Analysis and Design (Lab)	0-1
EE410	Power System Protection	3-0
EE410L	Power System Protection (Lab)	0-1
EE423	Advanced Electrical Machines	3-0
EE423L	Advanced Electrical Machines (Lab)	0-1
EE453	Electrical Power Transmission	3-0
EE453L	Electrical Power Transmission (Lab)	0-1
EE417	Power Electronics	3-0
EE417L	Power Electronics (Lab)	0-1
EE466	PLC and Industrial Drives	3-0
EE466L	PLC and Industrial Drives (Lab)	0-1
EE431	Power System Operation & Control	3-0
EE310	Power Generation	3-0
EE451	Power Economics & Management	3-0
EE452	Renewable Energy Systems	3-0
EE454	Fundamentals of High Voltage Engg	3-0
EE412	Digital Control Systems	3-0
EE461	Integrated Electronic Circuit	3-0
EE451	Embedded Systems	3-0
EE451L	Embedded Systems (Lab)	0-1
EE435	Power Generation & Utilization	3-0
EE436	Power Transmission & Distribution	3-0
EE436L	Power Transmission & Distribution (Lab)	0-1
EE308	Power System Analysis	3-0
EE308L	Power System Analysis (Lab)	0-1
EE322	Introduction to Power Engineering	3-0

Communication Track

Course Code	Course Title	Cr. Hrs.
COM308	Wave Propagation & Antenna	3-0
COM308L	Wave Propagation & Antenna (Lab)	0-1
EE439	Microwave Engineering	3-0
EE439L	Microwave Engineering (Lab)	0-1
EE338	Digital Communication	3-0
EE338L	Digital Communication (Lab)	0-1
EE429	Radar Systems & Television	3-0
EE429L	Radar Systems & Television (Lab)	0-1
EE441	Multimedia Communication	3-0
EE441L	Multimedia Communication (Lab)	0-1
COM385	Telecom Transmission and Switching	3-0
EE426	Artificial Intelligence	3-0
COM408	Optical Fiber Communication	3-0
COM470	Satellite Communication Systems	3-0
COM350	Mobile Communication	3-0
EE425	Electromagnetic Compatibility	3-0

Electronics Track

Course Code	Course Title	Cr. Hrs.
EE431	VLSI Design	3-0
EE431L	VLSI Design (Lab)	0-1
EE401	Digital System Design	3-0
EE401L	Digital System Design (Lab)	0-1
EE334	Industrial Electronics	3-0
EE334L	Industrial Electronics (Lab)	0-1
EE429	Radar Systems & Television	3-0
EE429L	Radar Systems & Television (Lab)	0-1
EE435	Digital Electronics	3-0
EE435L	Digital Electronics (Lab)	0-1
EE433	Industrial Process Control	3-0
EE433L	Industrial Process Control (Lab)	0-1
EE441	Digital Instrumentation	3-0
EE442	Digital Instrumentation (Lab)	0-1
EE439	Microwave Engineering	3-0
EE439L	Microwave Engineering (Lab)	0-1
COM326	Computer Communication Networks	3-0
COM326L	Computer Communication Networks (Lab)	0-1
EE480	Solid State Devices	3-0
EE480L	Solid State Devices (Lab)	0-1
EE322	Introduction to Power Engineering	3-0
EE417	Power Electronics	3-0
EE417L	Power Electronics (Lab)	0-1
COM308	Wave Propagation & Antenna	3-0
COM308L	Wave Propagation & Antenna (Lab)	0-1
EE427	Digital Image Processing	3-0
EE412	Digital Control Systems	3-0
EE428	Computer Vision	3-0
EE314	Opto Electronics	3-0
COM470	Satellite Communication Systems	3-0
EE425	Electromagnetic Compatibility	3-0
Ee327	Advanced Electronics	3-0
EE451	Embedded Systems	3-0
EE451L	Embedded Systems (Lab)	0-1
EE347	Transmission Lines and Waveguides	3-0
EE347L	Transmission Lines and Waveguides (Lab)	0-1