DEPARTMENT OF

ELECTRICAL ENGINEERING

PROGRAMS OFFERED

- B.Sc Electrical (Computer System) Engineering
- B.Sc Electrical Engineering Technology
- MS Electrical Engineering
- MS Electrical Engineering Technology
- P.hD Electrical Engineering

MISSION STATEMENT

To serve the engineering profession by offering high quality education to create professionals that contribute towards society by providing innovative solutions with a focus on research in Electrical Engineering and allied disciplines.

Message From Head Of Department

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Join the leading private sector university in the region and be a part of the exceptional educational experience offered by the Department of Electrical Engineering at CECOS. Our well-qualified faculty is dedicated to preparing young engineers and technologists for success, with a curriculum that emphasizes hands-on learning in state-of-the-art labs. We equip our students with essential skills like effective communication and problem-solving and offer opportunities for internships and industrial tours. Join us now and enjoy a rewarding journey toward your professional goals.

Dr. Azhar Qazi

Ph.D Electrical Engineering, CECOS University, Peshawar, Pakistan

Prof. Dr. Azhar Qazi
Head of Department / Professor
Ph.D Electrical
CECOS University, Peshawar

Engr. Col ® Ashfaq Ahmad
Associate Professor,
Director Welfare, CECOS University

Dr. Zaheer Farooq
Associate Professor
Director QEC, CECOS University
Ph.D Electrical Engineering
CECOS University, Peshawar

Dr. Kiran Raheel
Assistant Professor
M.Sc Communication Engineering UET, Peshawar
Ph.D
CECOS University

Dr. Khalid Rehman
Associate Professor
Ph.D Electrical Engineering
CECOS University, Peshawar

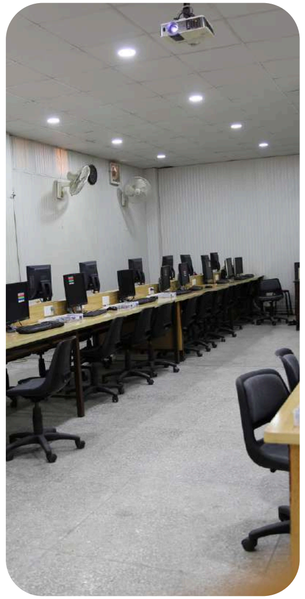
Engr. Ali Mujtaba Durrani
Lecturer
MS Power & Control
CECOS University, Peshawar
Ph.D (In Progress)
CECOS University

Engr. Usman Khan Khalil
Lecturer
MS Electrical Engineering
Sarhad University, Peshawar

Engr. Muhammad Adeel Khan
Lecturer
MS Electrical Engineering
CECOS University, Peshawar

FACULTY OF

ELECTRICAL ENGINEERINGERING



ELECTRICAL ENGINEERING LABORATORIES

- Circuit Lab
- Communications Lab
- Electrical Machines & Control Lab
- Electronics Lab
- Embedded Systems Lab
- Power Systems Lab
- Signal Processing Lab
- Computer Lab
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CURRICULUM OF ELECTRICAL (COMPUTER SYSTEM) ENGINEERING

Semester-I

Course Code	Course Title	Credit Hours
ENG-101	Functional English	3+0
MATH-106	Calculus and Analytic Geometry	3+0
ME-101	Engineering Mechanics & Thermodynamics	3+0
CS-110	Applications of Information & Communication Technologies	2+1
NS-101	Applied Physics	2+1
SS-203	Ideology and Constitution of Pakistan	2+0
SS-207	Understanding Quran	0+1
Total Credit Hours		18

Semester-II

Course Code	Course Title	Credit Hours
Math-108	Linear Algebra & Differential Equations	3+0
EE-101	Linear circuit Analysis	3+1
EE-102	Engineering Drawing	0+1
CS-111	Computer Programming	3+1
EE-112	Occupational Health & Safety	1+0
EE-105	Electrical Workshop Practice	0+1
SS-207	Understanding Quran	0+1
Total Credit Hours		17

Semester-III

Course Code	Course Title	Credit Hours
MATH -201	Complex Variables & Transforms	3+0
EE-203	Electrical Network Analysis	3+1
EE-221	Digital Logic Design	3+1
ENG-102	Expository Writing	3+0
EE-222	Electronic Devices & Circuits	3+1
SS-101	Islamic Studies	2+0
Total Credit Hours		20

Semester-IV

Course Code	Course Title	Credit Hours
MGT-331	Organizational Behavior	2+0
EE-231	Electrical Machines	3+1
MATH-202	Numerical Analysis	3+0
EE-223	Electronic Circuit Design	3+1
SS-102	Pakistan Studies	2+0
EE-215	Data Structure & Algorithams	3+0
Total Credit Hours		18

Semester-V

Course Code	Course Title	Credit Hours
EE-338	Power Distribution and Utilization	3+1
MATH-211	Probability and Statistics	3+0
EE-304	Electromagnetic Field Theory	3+0
EE-305	Embedded Systems	3+1
EE-311	Signals & Systems	3+1
Total Credit Hours		18

Semester-VI

Course Code	Course Title	Credit Hours
Mgt-333	Project Management	2+0
EE-312	Digital Signal Processing	3+1
EE-313	Communication Systems	3+1
EE-339	Digital System Design	3+0
EE-306	Linear Control Systems	3+1
Total Credit Hours		17

Semester-VII

Course Code	Course Title	Credit Hours
EE-414	Computer Communication Networks	3+1
SS-404	Civics & Community Engagement	2+0
EE-435	Internet of Things	3+0
EE-436	Operating Systems	3+0
EE-498	Senior Design Project 1	0+2
Total Credit Hours		14

Semester-VIII

Course Code	Course Title	Credit Hours
MGT-246	Introduction to Entrepreneurship	2+0
EE-416	Computer Architecture	3+1
EE-417	Artificial Intelligence	3+0
EE-499	Senior Design Project II	0+4
Total Credit Hours		13

Total Credit Hours = 133

Fact File

Duration: Four Years

Eligibility: a. Minimum 60% marks in Intermediate with Physics, Chemistry and Mathematics or DAE in Civil Technology or relevant field. The applicants with minimum 60% marks in Intermediate with Physics, Mathematics and Computer Science are also eligible with Chemistry to be studied and passed as a remedial course in 1st semester after admission.

b. Minimum 33% marks in test conducted by ETEA or any other testing body approved by PEC.

PROGRAM EDUCATIONAL OBJECTIVE (PEOS) OF ELECTRICAL ENGINEERING

PEO 1: Graduate demonstrating a blend of engineering technology & professional skills in Electrical Engineering & allied disciplines.

PEO 2: Graduate performing ethically & socially in a sustainable & responsible manner, as an individual & team member.

PEO 3: Graduate striving to enhance learning and practising skills.

PROGRAM LEARNING OUTCOMES (PLOS) OF ELECTRICAL ENGINEERING

PLO 1: **Engineering Knowledge:** An ability to apply knowledge of mathematics, science and engineering fundamentals and an engineering specialization to the solution of complex engineering problems. (WK-1-WK-4)

PLO 2: **Problem Analysis:** An ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK-1-WK-4)

PLO 3: **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. (WK-5)

PLO 4: **Investigation:** Conduct investigation of 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. (WK-8).

PLO 5: **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, with an understanding of the limitations. (WK-2 and WK-6)

PLO 6: **The Engineer and the World:** To 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 7: **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK-9)

PLO 8: **Individual and Collaborative Team Work:** An ability to work effectively, as an individual or in a team, on multifaceted and/or multidisciplinary settings. (WK-9)

PLO 9: **Communication:** 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 reports and design documentations, make effective presentations, and give and receive clear instructions. (WK-1 and WK-9)

PLO 10: **Project Management and Finance:** 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 multidisciplinary environment. (WK-2 and WK-5)

PLO 11: **Lifelong Learning:** To recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments. (WK-8 and WK-9)

CURRICULUM OF ELECTRICAL ENGINEERING TECHNOLOGY

Semester-I

Course Code	Course Title	Credit Hours
MATH-106	Calculus and Analytic Geometry	3+0
NS-100	Introduction to Physics	2+1
ET-101	Linear Circuits Analysis	2+1
SS-101	Islamic Studies	2+0
CS-190	Introduction to Computer Fundamentals	1+2
ET-102	Engineering Drawing	1+2
Total Credit Hours		17

Semester-II

Course Code	Course Title	Credit Hours
MATH-108	Linear Algebra and Differential Equations	3+0
ET-120	Electronics	2+2
MT-101	Basic Mechanical Technology	2+1
ET-130	Power Generation Systems	2+0
ET-131	Electrical Machines-I	2+1
Total Credit Hours		16

Semester-III

Course Code	Course Title	Credit Hours
SS-102	Pakistan Studies	2+0
ENG-103	Communication Skills	3+0
ET-222	Electrical Instruments and Measurements	2+2
ET-232	Electrical Machines-II	2+2
ET-221	Digital Electronics	2+2
Total Credit Hours		16

Semester-IV

Course Code	Course Title	Credit Hours
ET-230	AC Circuit Analysis	2+2
ET-201	Electro-Magnetic Fields	2+0
ET-234	Electrical Power Transmission	2+1
ET-233	Electrical Power Distribution & Utilization	3+1
ET-223	Power Electronics	2+1
ENG-202	Technical Report Writing	3+0
Total Credit Hours		17

Semester-V

Course Code	Course Title	Credit Hours
ET-301	Microprocessor Theory and Interfacing	2+1
ET-330	Switch Gear and Protective Devices	2+1
ET-310	Communications Technology	2+2
ET-302	Control Technology	2+1
MGT-335	Total Quality Management	3+1
ET-334	High Voltage Technology	2+1
Total Credit Hours		18

Semester-VI

Course Code	Course Title	Credit Hours
ET-331	Power System Analysis	2+0
ET-311	Data and Computer Communication	2+0
ET-333	Industrial Drives and PLC	2+2
MGT-333	Project Management	3+0
ET-498	Project-I	0+3
Total Credit Hours		18

Semester-VII

Course Code	Course Title	Credit Hours
ET-499	Project-II	0+3
ET-400	Supervised Industrial/Field Training	0+16
Total Credit Hours		19

Semester-VIII

Course Code	Course Title	Credit Hours
ET-400	Supervised Industrial/Field Training	0+16
Total Credit Hours		15

Total Credit Hours = 136

Fact File

Duration: Four Years
Eligibility: Minimum 50% marks in DAE Electrical or relevant field or Minimum 50% marks in F.Sc Pre-Engineering

PROGRAM EDUCATIONAL OBJECTIVE (PEOS) OF ELECTRICAL ENGINEERING

PEO 1: Graduate demonstrating a blend of engineering technology & professional skills in Electrical Engineering & allied disciplines.
PEO 2: Graduate performing ethically & socially in a sustainable & responsible manner, as an individual & team member.
PEO 3: Graduate striving to enhance learning and practising skills.

PROGRAM LEARNING OUTCOMES (PLOS) OF ELECTRICAL ENGINEERING

PLO 1: **Engineering Knowledge:** An ability to apply knowledge of mathematics, science and engineering fundamentals and an engineering specialization to the solution of complex engineering problems. (WK-1-WK-4)

PLO 2: **Problem Analysis:** An ability to identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK-1-WK-4)

PLO 3: **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. (WK-5)

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PLO 10: **Project Management and Finance:** 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 multidisciplinary environment. (WK-2 and WK-5)

PLO 11: **Lifelong Learning:** To recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments. (WK-8 and WK-9)

MS ELECTRICAL ENGINEERING

The MS degree program is of a 2 year duration and spans four 16-18 week semesters. Total credit hours for the MS program are 30 (i.e., 24 credit hours of coursework plus 6 credit hours of thesis and research in case of MS by research Plan-A).

In Year-II, selected students will embark on a thesis project (i.e. on basis of their CGPA, as well as synopsis defence); others will have to opt for the non-thesis track (i.e. all 30 credit hours derived from coursework Plan-B). Students with unsatisfactory performance in their thesis research will be shifted to the non-thesis track.

SCHEME OF STUDIES

MS Students must accumulate the requaired 30 credit hours as per the following distribution:

Plan-A

Category	Credit Hours
Core Subjects	12
Elective Subjects	12
Thesis	06
Total Credit Hours	30

Plan-B

Category	Credit Hours
Core Subjects	12
Elective Subjects	12
Additional Subjects	06
Total Credit Hours	30

M. TECH ELECTRICAL ENGINEERING

The Masters in Technology in Electrical Engineering students are required to complete a minimum of 24 credit hours of course work, followed by 6 credit hours of industrial training

PHD ELECTRICAL ENGINEERING

PhD is a 3 year degree program, during which the scholar must successfully complete 54 credit hours (18 credit hours course work and 36 credit hours research) beside other requirements as stipulated by the HEC and the University rules & regulations.

MS Electrical ENGINEERING

Curriculum for MS Electrical Engineering Program

COMMUNICATION ENGINEERING

Core Courses

Course Code	Subject	Credit Hours
EE 501	Advanced Digital Communication	3
EE 502	Advanced Digital Signal Processing	3
EE 503	Antenna Theory and Design	3
EM608	Statistical Methods for Engineering Data Analysis	3
EE 714	Advanced Digital System Design	3
EE 532	Advanced Wireless Communication	3
EE 537	Advanced Cryptography and Network Security	3
EE 506	Advanced Computer Networks	3
EE 514	Adaptive Filter Theory	3
EE 510	Optical Communication Systems	3

Elective Courses

Course Code	Subject	Credit Hours
EE 509	RF Communication Systems Design	3
EE 508	Mobile and Personal Communication	3
EE 507	Communication Theory	3
EE 512	Advanced Data Communication Systems	3
EE 513	Error Control Coding	3
EE 515	Emerging Technologies in Communication Engineering	3
EE 504	Information Communication Technology & Development	3
EE 530	Project Management in ICT Sector	3
EE 536	Research Methodology (Compulsory for Plan-A)	3
EE 538	Advanced Mobile Propagation Channel Modeling	3
EE 539	Special Topics in Communication Engineering	3

FACT FILE ELIGIBILITY

- B.Sc Electrical Engineering (16 years education) in the relevant field with minimum 2.00 CGPA or equivalent duly accredited by PEC.
- GAT General Test.

POWER & CONTROL ENGINEERING

Core Courses

Course Code	Subject	Credit Hours
EE 516	Linear Control Systems	3
EE 517	Advanced Power System Analysis	3
EE 518	Advanced Electrical Machines and Drives	3
EE 519	Advanced Power Electronics	3
EE 522	Advanced Power System Operation and Control	3
EE 523	High Tension Transmission Lines	3
EE 529	Advanced Power System Protection	3
EE 531	Advanced High Voltage Engineering Methodology	3
EE 526	Fuzzy Control Systems	3
EE 527	Digital Optimal Control	3
EE 740	Distributed Generation	3

Elective Courses

Course Code	Subject	Credit Hours
EE 501	Advanced Digital Communications	3
EE 521	Advanced Machines	3
EE 524	Adaptive Control	3
EE 525	Robotics	3
EE 533	Smart Grid	3
EE 534	Special Topic in Power & Control Engineering	3
EE 535	Renewable Energy Resources	3
EE 536	Research Methodology (Compulsory for Plan-A)	3
EE 528	Nonlinear Control Systems	3
EE 780	Micro Grid	3
EE 751	Energy Storage	3

FACT FILE ELIGIBILITY

- BE/B.Sc. Engineering.
- GAT General Test.

MS Electrical ENGINEERING

Curriculum for MS Electrical Engineering Program

Artificial Intelligence

Core Courses

Course Code	Subject	Credit Hours
EE-601	Machine Learning	3
EE-602	Artificial Intelligence	3
EE-603	Mathematical and computational Foundations for Artificial Intelligence	3
EE-604	Statistical Learning Theory	3
EE-605	Knowledge representation and Reasoning	3
EE-606	Advanced Analysis of Algorithms	3

Elective Courses

Course Code	Subject	Credit Hours
EE-607	Convex Optimization	3
EE-608	Special topics in machine learning	3
EE-609	Intelligent control systems	3
EE-610	Artificial intelligence for robotics	3
EE-611	Special topics in artificial learning	3
EE-612	Aspects of computational intelligence	3
EE-613	Deep learning	3
EE-614	Data Mining	3
EE-615	Information Retrieval	3
EE-616	Advanced Image Processing	3
EE-617	Computer Vision	3
EE-618	Speech Processing	3
EE-619	Data Acquisition and Control	3
EE-620	Robot Motion Planning	3
EE-621	Pattern Recognition	3

Elective Courses

Course Code	Subject	Credit Hours
EE-622	Knowledge Representation and Reasoning	3
EE-623	Neural Networks	3
EE-624	Probabilistic Robotics	3
EE-625	Sensors and Sensing	3
EE-626	Human Robot Interaction	3
EE-627	Simultaneous Localization and Mapping	3
EE-628	Intelligent Systems	3
EE-629	Reinforcement Learning	3
EE-630	Advanced Signal Processing	3
EE-631	Intelligent Transportation Systems	3
EE-632	Social Simulations	3
EE-633	Serious Games	3
EE-634	Ethical Machines	3
EE-635	Evolutionary Algorithms	3
EE-636	Statistical Machine Learning	3
EE-637	Geometric Deep Learning	3
EE-638	Generative Deep Models	3
EE-639	Applied Game Theory	3
EE-640	Cognitive Modeling	3
EE-536	Research Methodology	3

FACT FILE ELIGIBILITY

- BE/B.Sc. Engineering.
- GAT General Test.

MASTER OF ELECTRICAL ENGINEERING TECHNOLOGY

Curriculum for Master of Technology Electrical Engineering Program

Courses

Course Code	Subject	Credit Hours
EE862	Power System Analysis Engineering Technology	3
EE863	Advance Machine Technology	3
EE864	Digital Optimal Control	3
EE865	Advance Power Electronics	3
EE866	Advanced Topics in Engineering Technology	3
EE867	Transmission Lines and Power System Operation	3
EE868	Advance Power System Protection	3
EE870	Digital Control System	3
EE871	Energy Storage	3

FACT FILE ELIGIBILITY

- B-Tech (Hons)
- GAT General Test.

PhD Electrical ENGINEERING

Curriculum for MS Electrical Engineering Program

COMMUNICATION ENGINEERING

Courses

Course Code	Subject	Credit Hours
EE 700	Advanced Digital Communications	3
EE701	Advanced Wireless Communications	3
EE702	Satellite Communication	3
EE703	Optical Communication	3
EE704	Digital Image Processing	3
EE705	Mobile and Pervasive Computing	3
EE706	Digital Electronics	3
EE707	Green Communication	3
EE708	Radio Frequency Electronics for Mobile Communication Systems	3
EE709	Wireless Low Power System Architecture	3
EE710	DSP Software System Design	3
EE711	DSP Hardware System Design	3
EE712	Applied Signal Processing	3
EE713	Signal Detection and Estimation	3
EE720	Advanced Computer and Telecommunication Networks	3
EE721	Network Management and QoS Provisioning	3

Courses

Course Code	Subject	Credit Hours
EE722	Stochastic Processes	3
EE723	Wireless and Optical Communications	3
EE724	Wireless Sensor Networks	3
EE725	Cryptographic Algorithms	3
EE726	Software Quality Assurance and Testing	3
EE727	Artificial Intelligence	3
EE728	Research Methodology	3
EE729	Network and Protocol Simulation	3
EE800	Analysis of wave propagation	3
EE801	Advanced Digital Signal Proccesses	3
EE802	Information Theory and Coding	3
EE803	Transmission and Switching Systems	3
EE804	RF and Microwave Engineering	3
EE805	Modern Navigation and Radar Systems	3
EE806	Antenna Theory and Design	3
EE807	Embedded System Design	3

FACT FILE ELIGIBILITY

- MS Electrical Engineering (18 years education) in the relevant field with minimum 3.00 CGPA or equivalent duly accredited by PEC.
- GAT General Test.

PhD Electrical ENGINEERING

Curriculum for MS Electrical Engineering Program

POWER & CONTROL ENGINEERING

Courses

Course Code	Subject	Credit Hours
EE808	Optimization Methods for Engineering	3
EE809	Advance Multimedia Communication	3
EE810	Analysis of stochastic Systems	3
EE811	Advance Digital System Design	3
EE812	Adaptive Filter Theory	3
EE813	Multi-rate Systems and Filter Banks	3
EE820	Switch and router architectures	3
EE821	Network Modeling: theory and simulation	3
EE822	Efficient Network Deployment Architecture	3
EE823	Quantum Theory	3
EE824	Cellular Networks Design	3
EE825	Energy Efficient Routing Algorithms For Telecommunication Networks	3
EE826	Operation Research: Theory And Applications To Networking	3
EE827	Model Order Reduction Techniques	3
EE828	Networks Security	3
EE829	Parallel And Distributed Computing	3
EE830	Digital Forensics	3

FACT FILE ELIGIBILITY

COMMUNICATION ENGINEERING

- MS Electrical Engineering (18 years education) in the relevant field with minimum 3.00 CGPA or equivalent.
- GAT-General Test

FACT FILE ELIGIBILITY

POWER & CONTROL ENGINEERING

- MS Electrical Engineering (18 years education) in the relevant field with minimum 3.00 CGPA or equivalent.
- GAT-General Test

PhD Electrical ENGINEERING

Curriculum for MS Electrical Engineering Program

POWER & CONTROL

Courses

Course Code	Subject	Credit Hours
EE740	Distribution Generation (Core for MS)	3
EE741	Power System Modeling and Analysis	3
EE742	Renewable Energy Systems	3
EE743	Integration of Power System	3
EE744	Sustainable Power Systems: Planning, Operation and Markets	3
EE745	Computational Methods in Power Engineering	3
EE746	Computer Analysis Methods in Engineering	3
EE747	Statistics in Research	3
EE748	Power System Dynamics	3
EE749	Transients in Power Systems	3
EE760	Nonlinear Control System	3
EE761	Optimal Control System	3
EE762	Fuzzy Control	3
EE763	Adaptive Control System	3
EE764	Discrete Time Control System	3
EE765	Mobile Robotics	3
EE766	System Identification	3
EE767	Robust Control	3
EE768	Modeling and Simulation of Dynamic Systems	3
EE840	Advanced Power System Transmission	3
EE841	Advance Power System Distribution	3
EE842	Advanced Power System Protection	3
EE843	Advanced Topics in Power System	3
EE844	Advanced Topic in Energy	3
EE845	Power Delivery Systems	3
EE846	Smart Grid Design and Operation	3
EE847	Power System Reliability	3
EE848	Hydro Engineering	3
EE849	Power Electronics for Energy Systems	3
EE860	Advanced Digital Control Systems	3
EE861	Control Systems Optimization	3