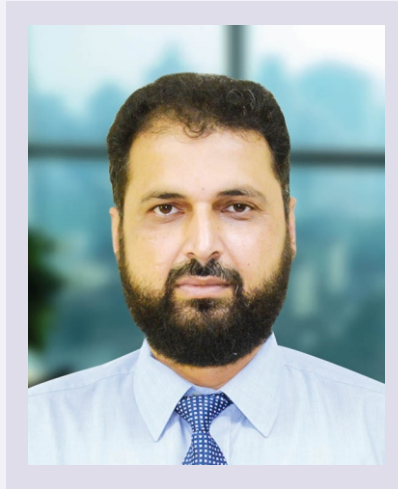


**FACULTY  
OF  
ENGINEERING**

# DEAN'S MESSAGE



Dr. Imtiaz Ahmad Taj

The Faculty of Engineering aims to produce engineers and researchers, who are equipped with knowledge and expertise to meet the challenges of dynamic and evolving engineering domains. To achieve this objective, a team of highly qualified and dedicated faculty members is available full time and is committed to train and groom the students who have selected engineering as their profession. The academic program is supported by well-equipped labs that strengthen the applied aspect of the discipline, and provides hand-on skills to future engineers and researchers. A numbers of highly reputed research groups exist in the Faculty of Engineering, which are involved in extensive applied research on novel ideas and industrial problems. In these groups, various projects under which research and development work is in progress in close collaboration with R&D

organizations and industry, supported by the national & international funding agencies.

The Faculty of Engineering currently offers graduate and undergraduate programs in Electrical Engineering, Civil Engineering, Mechanical Engineering and Engineering Management. The students are being prepared for a career in industry, academia or research, by providing them with a thorough foundation of the fundamental concepts and analytical tools of contemporary engineering domains. The faculty envisions to contribute towards a knowledge-based economy of the country, with skilled professionals having curious minds, learning attitude and ethical behaviors, who are ready to undertake engineering challenges of our society.

# FACULTY MEMBERS

## Department of Electrical Engineering

### ■ Dr. Muhammad Mansoor Ahmed

PhD Microelectronics (University of Cambridge, UK)  
CEng (UK), FIEE (UK)  
SMIEEE (USA), Eur. Ing (Brussels)  
MS Solid State Physics, (University of Punjab)  
MSc Electronics, (QAU, Islamabad)  
Professor / Vice Chancellor

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### ■ Dr. Imtiaz Ahmad Taj

PhD Electronics & Inf. Engineering (Hokkaido University, Sapporo, Japan)  
MS Electronics & Information Engineering, (Hokkaido University, Sapporo, Japan)  
Professor / Dean FoE

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### ■ Dr. Noor Muhammad Khan

PhD Electrical Engineering (UNSW, Australia)  
BS Electrical Engineering (University of Engineering and Technology, Lahore)  
Professor/HoD EE

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### ■ Dr. Fazal-ur-Rahman

PhD Control Systems (McGill University, Canada)  
Master of Engineering, Control Systems (McGill University, Canada)  
MS Mathematics (BZU Multan)  
MSc Mathematics (BZU Multan)  
Professor

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### ■ Dr. Aamer Iqbal Bhatti

PhD Industrial Control Systems (Leicester University, UK)  
MSc Control Systems (Imperial College London, UK)  
BS Electrical Engineering (University of Engineering and Technology, Lahore, Pakistan)  
Professor / Dean ORIC

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### ■ Dr. Muhammad Ashraf

PhD Systems Engineering (University of Liverpool, UK)  
MSc Engineering (PIEAS, Islamabad)  
Professor

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### ■ Dr. Umer Amir Khan

PhD Electrical Engineering (Hanyang Uni. ERICA Campus, South Korea)  
MS Electrical Engineering (Hanyang Uni. ERICA Campus, South Korea)  
Diploma in Project Management, (CASE, Islamabad)  
Assistant Professor

---

### ■ Dr. Muhammad Tahir Awan

PhD Electrical Engineering (Capital University of Science and Technology, Islamabad)  
MSc Computer Engineering (Lahore University of Management Sciences, Lahore)  
BS Electrical Engineering (University of Engineering and Technology, Lahore)  
Assistant Professor

---

### ■ Mr. Umer Maqbool

MS Communication Systems (University of Hertfordshire, UK)  
BS Electronic Engineering (Institute of Space Technology)  
Assistant Professor

---

### ■ Mr. Muhammad Naem

MS Electrical Power & Control Engineering (CASE, Islamabad)  
BSc Electrical Power Engineering (Islamia University of Bahawalpur)  
Lecturer

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### ■ Qazi Abdul Moqueet

MS Engineering Management (University of Engineering and Technology, Taxila)  
BS Electrical Telecommunication (COMSATS, Islamabad)  
Lecturer

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■ **Mr. Inam Elahi**

MPhil English Linguistics (University of Lahore)  
Post Graduate Diploma (AIU, Islamabad)  
MA English Literature (University of Engineering and  
Technology, Lahore)  
Lecturer

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■ **Mr. Muhammad Moin Qasim**

MS Electronic Engineering (Capital University of Science  
and Technology, Islamabad)  
BS Electronic Engineering (M.A.J.U, Islamabad)  
Lecturer

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■ **Mr. Osama Munir**

MS Electronics Engineering (Karadeniz Technical Uni.  
Trabzon, Turkey)  
Bachelor of Electronics Engineering (Mohammad Ali Jinnah  
Uni. Islamabad)  
Associate Lecturer

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■ **Mr. Muhammad Waleed Farooq**

MS Electronic Engineering (CUST, Islamabad)  
BS Electronic Engineering (M.A.J.U, Islamabad)  
Associate Lecturer

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■ **Mr. Abdul Rauf**

MS Electronic Engineering (EME, NUST, Islamabad)  
BS Electrical Engineering (Gomal University, Islamabad)  
Lab Engineer

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■ **Mr. Attabik Tabib** BS Electronics Engineering (CUST,  
Islamabad)  
Lab Engineer

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■ **Mr. Amir Hamza**

BS Electrical Engineering (COMSATS)  
Lab Engineer

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■ **Mr. Ahmed Ali**

BS Electrical Engineering (Capital University of Science and  
Technology, Islamabad)  
Lab Engineer

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■ **Mr. Muhammad Abdullah Farooq**

BS Electrical Engineering (Capital University of Science and  
Technology, Islamabad)  
Lab Engineer

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**Department of Mechanical Engineering**

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■ **Dr. Mohammad Javed Hyder**

PhD Mechanical Engineering, Rensselaer Polytechnic  
Institute (RPI), Troy NY, USA  
MS (Mechanical Engineering) George Washington Uni. USA  
Professor

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■ **Dr. Muhammad Mahabat Khan**

PhD (University of Ecole Centrale de Lyon, France)  
MSc Advance Mechanical Engineering (University of Leeds,  
UK)  
BEng Mechatronics Engineering (Air University, Islamabad)  
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■ **Dr. Khawar Naveed Abbasi**

PhD Nuclear Engineering (University of London)  
MSc Nuclear Engineering (QAU Islamabad)  
BE Mechanical Engineering (Mehran University Jamshoro)  
Assistant Professor

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■ **Dr. Waqas Akbar Lughmani**

PhD Mechanics (Loughborough University, UK)  
MS Mechanical Engineering (Myongji University, South  
Korea)  
BSc (Mechanical Engineering (University of Engineering  
and Technology, Peshawar)  
Assistant Professor

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■ **Dr. Muhammad Irfan**

PhD Mechanical Engineering (KOC University, Istanbul,  
Turkey)  
MS Mechanical Engineering (PIEAS, Islamabad)  
BSc Hons (UET, Taxila)  
Assistant Professor

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■ **Dr. Taiba Zahid**

PhD Engineering (Technical University Dresden, Germany)  
MSc Manufacturing & Production (NUST, Islamabad)  
BSc Mechanical Engineering (University of Engineering and Technology, Taxila)  
Assistant Professor

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■ **Dr. Salman Sagheer Warsi**

PhD Design Manufacturing Engineering (NUST, Islamabad)  
MS Design Manufacture and Management (University of Durham, United Kingdom)  
BSc Mechanical Engineering (UET, Taxila)  
Assistant Professor

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■ **Syed Hassan Shah**

MS Materials Science and Engineering (Uni. of Delaware, Newark, DE, USA)  
BS Mechanical Engineering (NED Uni. of Engineering & Technology, Karachi)  
Assistant Professor

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■ **Mr. Saif Ullah**

MS Mechatronics Engineering (University of Southern Denmark)  
BSc Honors Mechanical Engineering (Islamic University of Technology - Dhaka)  
Assistant Professor

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■ **Mr. Khalid Mahmood**

MSc Engineering Management (UET, Taxila)  
BE Avionics Engineering (CAE PAF Academic, Risalpur)  
Assistant Professor

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■ **Mr. Tauseef Ahmed**

MS Mechanical Engineering (NUST, Islamabad)  
BE Mechanical Engineering (NUST, Islamabad)  
Assistant Professor

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■ **Ms. Shummaila Rasheed**

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BSc Mechanical Engineering (University of Engineering and Technology, Lahore)  
Lecturer

■ **Mr. Muhammad Rizwan Siddiqui**

MS Mechanical Engineering (GIKI, Topi Swabi, KP)  
BS Mechanical Engineering (HITEC, Taxila)  
Lecturer

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■ **Mr. Manzar Masud**

MS Mechanical Engineering (HITEC, Institute Taxila)  
BS Aerospace Engineering (Institute of Space Technology, Islamabad)  
Lecturer

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■ **Mr. Muhammad Zulfiqar**

MS Mechanical Engineering (NUST, Islamabad)  
BS Mechanical Engineering (HITEC University, Taxila)  
Lecturer

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■ **Mr. Muhammad Haroon**

MS Mechanical Engineering (International Islamic University, Islamabad)  
BS Mechanical Engineering (International Islamic University, Islamabad)  
Associate Lecturer

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■ **Mr. Faraz Qaiser Malik**

MS Mechanical Engineering, (NUST, Islamabad)  
BS in Mechanical Engineering, (CUST, Islamabad)  
Associate Lecturer

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■ **Raja Awais Liaqait**

Bachelor in Mechanical Engineering (CUST)  
Lab Engineer

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■ **Mr. Muhammad Ahmed**

BS Mechanical Engineering (CUST, Islamabad)  
Lab Engineer

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■ **Ms. Shermeen Hamid**

BS Mechanical Engineering (CUST, Islamabad)  
Lab Engineer

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■ **Mr. Zain ul Abdeen**

BS Mechanical Engineering (CUST, Islamabad)  
Lab Engineer

■ **Mr. Fakhar ul Hasnain**

BS Mechanical Engineering (M.A.J. U, Islamabad)  
Lab Engineer

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■ **Mr. Ahmed Jamal**

BS Mechanical Engineering (UET, Taxila)  
Lab Engineer

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■ **Mr. Rizwan Khalil**

BS Mechanical Engineering (CUST, Islamabad)  
Lab Engineer

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**Department of Civil Engineering**

■ **Dr. Ishtiaq Hassan**

PhD Civil Engineering (UET, Taxila)  
MSc Water Resources and Irrigation Engineering (UET, Taxila)  
BSc Civil Engineering (UET, Taxila)  
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■ **Dr. Majid Ali**

PhD Civil Engineering (University of Auckland, New Zealand)  
MSc Structural Engineering (UET, Taxila)  
BSc Civil Engineering (UET, Taxila)  
Professor

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■ **Dr. Syed Shujaa Safdar Gardezi**

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MSc Engineering Management (UET, Taxila)  
BSc Civil Engineering (UET, Taxila)  
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Assistant Professor

■ **Dr. Shahmir Janjua**

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BS Civil Engineering (NUST, Islamabad)  
Assistant Professor

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■ **Ms. Faiza Khalid**

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BS Civil Engineering (University of Engineering and Technology, Taxila)  
Lecturer

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■ **Mr. Iqbal Ahmad**

MS Civil Engineering (CUST, Islamabad)  
BS Civil Engineering (University of Engineering and Technology, Peshawar)  
Lecturer

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BS Civil Engineering (University of Engineering and Technology, Taxila)  
Lecturer

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■ **Mr. Huzaifah Zahran**

MS Water Engineering (University of Sheffield, UK)  
BS Civil Engineering (NUST, Islamabad)  
Lecturer

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■ **Mr. Talha Bin Tahir**

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BS Civil Engineering (NUST, Risalpur)  
Lecturer

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■ **Mr. Shaheed Ullah**

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BSc Civil Engineering (University of Engineering and Technology, Peshawar)  
Lecturer

■ **Mr. Muhammad Bilal**

Master in CE (NUST, Islamabad)  
Bachelor in CE (UET, Taxila)  
Lecturer

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■ **Mr. Mehran Sudheer**

MS in Structural Engineering (Capital University of Science and Technology, Islamabad)  
BS in Civil Engineering (Capital University of Science and Technology, Islamabad)  
Lecturer

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■ **Mr. Sohail Afzal**

MS Civil Engineering (Capital University of Science and Technology, Islamabad)  
BS Civil Engineering (The University of Lahore, Islamabad)  
Associate Lecturer

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■ **Mr. Usman Hussain**

MS Civil Engineering (CUST, Islamabad)  
BSc Civil Engineering (UET, Taxila)  
Associate Lecturer

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■ **Ms. Kainat Batool**

BS Civil Engineering (CUST, Islamabad)  
Lab Engineer

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■ **Mr. Umair Ahmed**

BS Civil Engineering (CUST, Islamabad)  
Lab Engineer

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■ **Mr. Talha Ahmed**

BS Civil Engineering (Capital University of Science and Technology, Islamabad)  
Lab Engineer

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■ **Mr. Arsalan Amjad**

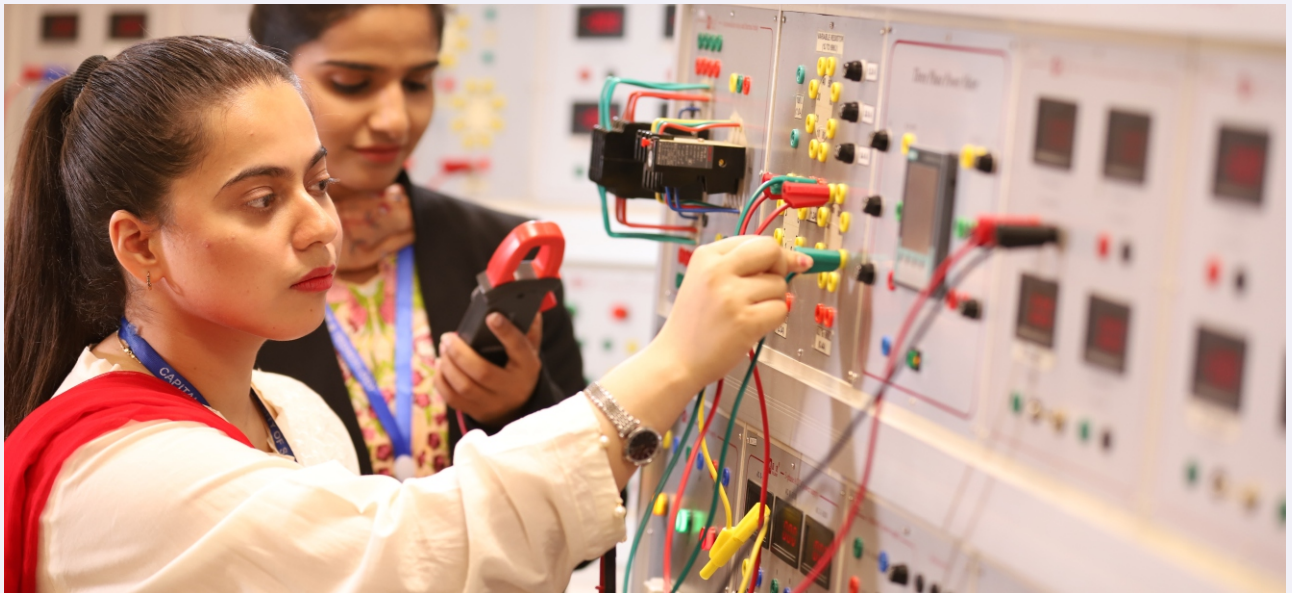
BS Civil Engineering (Capital University of Science and Technology, Islamabad)  
Lab Engineer

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■ **Mr. Minhas Shah**

BS Civil Engineering (Capital University of Science and Technology, Islamabad)  
Lab Engineer

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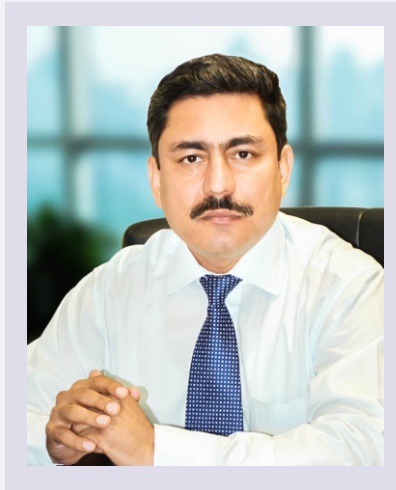






**DEPARTMENT  
OF  
ELECTRICAL ENGINEERING**

# HOD'S MESSAGE



Dr. Noor Muhammad Khan

The Department of Electrical Engineering is dedicated to continued innovation through its high quality academic programs and competitive research. The department offers undergraduate program in Electrical Engineering and graduate programs in Electrical Engineering and Computer Engineering which cover a wide spectrum of fields while keeping up with their fast pace of technological advancement.

We consider educating and nourishing the next

generation of engineers as a key role in the technological development of the society. Trained in well-equipped state-of-the-art laboratories, the graduates of the Department of Electrical Engineering are highly valued by industry due to their technical competence, solid analytical skills and critical thinking. The faculty at Electrical Engineering Department is equipped with vast industrial, academic and research experience, and is instrumental in providing excellence both theoretically and practically.

# BS Electrical Engineering

## ■ Program Educational Objectives (PEOs)

The BS(EE) program aims to produce leading professionals who will:

- (i) Serve competently in national and international industry or academia by showing requisite knowledge and skills in the field of Electrical Engineering.
- (ii) Exhibit quest for learning and initiative through elevation in education or growth in professional status.
- (iii) Demonstrate commitment to ethical practices, community service and societal contribution.

## ■ Program Learning Outcomes (PLOs)

At the time of graduation the graduates of BS(EE) program will possess the following attributes:

- (i) **Engineering Knowledge:** An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- (ii) **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.
- (iii) **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.

- (iv) **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.
- (v) **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, with an understanding of the limitations.
- (vi) **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.
- (vii) **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.
- (viii) **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
- (ix) **Individual and Team Work:** An ability to work effectively, as an individual or in a team, on multifaceted and /or multidisciplinary settings.
- (x) **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 reports and design documentation, make effective

presentations, and give and receive clear instructions.

- (xi) **Project Management:** 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 multidisciplinary environment.
- (xii) **Lifelong Learning:** An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

### ■ Admission Requirements

- (i) Higher Secondary School Certificate (FSc Pre-Engineering) or Equivalent with Physics,

Chemistry and Mathematics securing at least 60% marks in aggregate

OR

Diploma of Associate Engineer Examination in relevant discipline securing at least 60% marks in aggregate (upto 2% of maximum allowed seats)

- (ii) CUST Admission Test/HEC Approved Test

### ■ Degree Requirements

Each candidate for the BS Electrical Engineering degree is required to successfully earn 136 credit hours (Cr. Hrs.) as per the following detail:

Area	Cr. Hrs.
(a) Humanities Courses	19
(b) Natural Science Courses	19
(c) Computing Courses	09
(d) Management Science Courses	06
(e) Inter Disciplinary Engineering Electives (IDEE)	07
(f) Foundation Courses	25
(g) Core Courses	27
(h) Elective/Depth Courses	18
(i) Internship	00
(j) Community Service	00
(k) Design Project	06
<b>Total</b>	<b>136</b>

### ■ Humanities Courses (19 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Pakistan Studies	HMEE1002	2
English I (Functional English)	HMEE1013	3

English II (Communication Skills)	HMEE1023	3
Technical Report Writing	HMEE2033	3
Islamic Studies	HMEE2012	2
Humanities I: Professional Ethics	HMEE3133	3
Humanities II: Sociology for Engineers	HMEE3063	3

### ■ Natural Science Courses (19 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Calculus and Analytical Geometry	MTEE1013	3
Linear Algebra	MTEE1033	3
Applied Differential Equations	MTEE1043	3
Complex Variables and Transforms	MTEE2053	3
Applied Physics	PHEE1013	3
Applied Physics Lab	PHEE1011	1
Probability and Random Variables	EE2413	3

### ■ Computing Courses (9 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Introduction to Computing	CSEE1101	1
Introduction to Computing Lab	CSEE1111	1
Computer Programming	CSEE1122	2
Computer Programming Lab	CSEE1121	1
OOP and Data Structures	CSEE2123	3
OOP and Data Structures Lab	CSEE2121	1

### ■ Management Science Courses (6 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Leadership	MGTE4113	3
Personal Grooming & Management	MGTE4xx3	3
Project Management	MGTE4063	3



Total Quality Management	MGTE4083	3
Engineering Management	MGTE4503	3
Project Cost and Financial Management	MGTE4093	3
Entrepreneurship	MGTE4073	3

### ■ Inter Disciplinary Engineering Elective (IDEE) (7 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Applied Thermodynamics	MEEE1113	3
Environmental Engineering	CEEE3713	3
Geoinformatics	CEEE2113	3
Engineering Surveying	CEEE1113	3
Engineering Surveying Lab	CEEE1111	1
Applied Mechanics	MEEE2023	3
Mechanical Engineering Lab	MEE3031	1

### ■ Foundation Courses (25 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Engineering Drawing	EE1011	1
Workshop Practice	EE1021	1
Linear Circuit Analysis	EE1213	3
Linear Circuit Analysis Lab	EE1211	1
Electrical Network Analysis	EE2253	3
Basic Electronics	EE2223	3
Basic Electronics Lab	EE2221	1
Digital Logic Design	EE2313	3
Digital Logic Design Lab	EE2311	1
Signals and Systems	EE2613	3
Signals and Systems Lab	EE2611	1
Microprocessor and Computer Architecture	EE3323	3
Microprocessor and Computer Architecture Lab	EE3321	1

### ■ Core Courses (27 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Communication Systems	EE3713	3
Communication Systems Lab	EE3711	1

Electrical Machines	EE3283	3
Electrical Machines Lab	EE3281	1
Electromagnetic Fields and Waves	EE3513	3
Power Distribution and Utilization	EE3103	3
Power Distribution and Utilization Lab	EE3101	1
Instrumentation and Measurements	EE3263	3
Instrumentation and Measurements Lab	EE3261	1
Control Systems	EE4813	3
Control Systems Lab	EE4811	1
Electronics Circuit Design	EE2233	3
Electronics Circuit Design Lab	EE2231	1

## ■ Elective/Depth Courses (18 Cr. Hrs)

### a–Electronics Engineering

Course Title	Code	Cr. Hrs.
Digital Signal Processing (Depth Core I)	EE4623	3
Digital Signal Processing Lab (Depth Core I)	EE4621	1
ASIC Design and FPGAs (Depth Core II)	EE4273	3
ASIC Design and FPGAs Lab (Depth Core II)	EE4271	1
Embedded Systems	EE3333	3
Embedded Systems Lab	EE3331	1
Digital Communications	EE3723	3
Digital Communications Lab	EE3721	1
Analog Integrated Electronics	EE4223	3
Industrial Electronics	EE4263	3
Power Electronics	EE4293	3
Microwave Engineering	EE4523	3
Microwave Engineering Lab	EE4521	1
Antenna Theory and Design	EE4533	3
Digital Image Processing	EE4633	3
Wireless Communications	EE4733	3
Computer Communication and Networks	EE4713	3
Digital Control Systems	EE4823	3
Numerical Analysis	EE2403	3

## **b–Telecommunications Engineering**

<b>Course Title</b>	<b>Code</b>	<b>Cr. Hrs.</b>
Digital Signal Processing (Depth Core I)	EE4623	3
Digital Signal Processing Lab (Depth Core I)	EE4621	1
Digital Communications (Depth Core II)	EE3723	3
Digital Communications Lab (Depth Core II)	EE3721	1
Microwave Engineering	EE4523	3
Microwave Engineering Lab	EE4521	1
Antenna Theory and Design	EE4533	3
Optical Communications	EE4553	3
Digital Image Processing	EE4633	3
Wireless Communications	EE4733	3
Satellite Communications	EE4743	3
Computer Communications and Networks	EE4713	3
Network Design and Management	EE4763	3
Wireless Sensor Networks	EE4783	3
Numerical Analysis	EE2403	3
Radar Systems	EE4663	3

## **c–Power Systems Engineering**

<b>Course Title</b>	<b>Code</b>	<b>Cr. Hrs.</b>
Power System Analysis (Depth Core I)	EE3113	3
Power System Analysis Lab (Depth Core I)	EE3111	1
Electrical Power Transmission (Depth Core II)	EE4123	3
Electrical Power Transmission Lab (Depth Core II)	EE4121	1
Power Generation	EE4143	3
Power Electronics	EE4293	3
Industrial Electronics	EE4263	3
Power System Protection	EE4153	3
Power System Protection Lab	EE4151	1
High Voltage Engineering	EE4183	3
Digital Control Systems	EE4823	3
Numerical Analysis	EE2403	3

### ■ Design Project (6 Cr. Hrs)

After the completion of 90 Cr. Hrs., the students are required to demonstrate their practical skills in the field

of Electrical Engineering by designing and implementing a design project worth 6 Cr. Hrs. The project shall be completed in two parts as given below:

Course Title	Code	Cr. Hrs.
Design Project (Part-I)	EE4912	2
Design Project (Part-II)	EE4924	4

### ■ Industrial Internship (EE4000)

Each student is required to complete an 8-week industrial internship training usually after 6 semesters or on the completion of 90 Cr. Hrs. The internship shall be graded as pass/fail.

### ■ CGPA Requirement

A student is required to earn a minimum 2.00/4.00 CGPA on the completion of his/her degree requirements.

### ■ Community Service (VIS4000)

Each student is required to complete 65 hours community work, usually after 4<sup>th</sup> semester which would be a prerequisite for the award of degree.

### ■ Program Duration

This is a four year degree program comprising of 8 semesters. There will be a Fall and a Spring semester in each year. The summer semester will be utilized for internship or deficiency courses. The maximum duration to complete BS Electrical Engineering degree is 07 years.



# SCHEME OF STUDIES

## BS Electrical Engineering Program

### □ Semester-I (15 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
HMEE1002	Pakistan Studies	Humanities	2
HMEE1013	English-1(Functional English)	Humanities	3
MTEE1013	Calculus and Analytical Geometry	Natural Sciences	3
PHEE1013	Applied Physics	Natural Sciences	3
PHEE1011	Applied Physics Lab	Natural Sciences	1
CSEE1101	Introduction to Computing	Computing	1
CSEE1111	Introduction to Computing Lab	Computing	1
EE1011	Engineering Drawing	EE Foundation	1

### □ Semester-II (17 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
HMEE1023	English-II (Communication Skills)	Humanities	3
MTEE1033	Linear Algebra	Natural Sciences	3
MTEE1043	Applied Differential Equations	Natural Sciences	3
CSEE1122	Computer Programming	Computing	2
CSEE1121	Computer Programming Lab	Computing	1
EE1213	Linear Circuit Analysis	EE Foundation	3
EE1211	Linear Circuit Analysis Lab	EE Foundation	1
EE1021	Workshop Practice	EE Foundation	1

### □ Semester-III (18 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
MTEE2053	Complex Variables and Transforms	Natural Sciences	3
CSEE2123	OOP and Data Structures	Computing	3
CSEE2121	OOP and Data Structures Lab	Computing	1



EE2253	Electrical Network Analysis	EE Foundation	3
EE2223	Basic Electronics	EE Foundation	3
EE2221	Basic Electronics Lab	EE Foundation	1
EE2313	Digital Logic Design	EE Foundation	3
EE2311	Digital Logic Design Lab	EE Foundation	1

□ Semester-IV (18 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
MEE3333	Microprocessor and Computer Architecture	EE Foundation	3
EE2413	Probability and Random Variables	Natural Sciences	3
EE2613	Signals & Systems	EE Foundation	3
EE2611	Signals & Systems Lab	EE Foundation	1
EE2233	Electronics Circuit Design	EE Core	3
EE2231	Electronics Circuit Design Lab	EE Core	1
ME/CE2xx3	IDEE-I	IDEE	3
EE3321	Microprocessor and Computer Architecture Lab	EE Foundation	1

□ Semester-V (18 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
HMEE3xx3	Humanities-I	Humanities	3
ME/CE3xx3	IDEE-II	IDEE	3
ME/CE37xx1	IDEE-II Lab	IDEE	1
EE3283	Electrical Machines	Core	3
EE3281	Electrical Machines Lab	Core	1
EE3713	Communication Systems	EE Core	3
EE3711	Communication Systems Lab	EE Core	1
EE3513	Electromagnetic Fields and Waves	EE Core	3

Semester-VI (17 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
HMEE1012	Islamic Studies	Humanities	2
EE3143	Power Distribution and Utilization	Breadth Core	3
EE3141	Power Distribution and Utilization Lab	Breadth Core	1
EE3263	Instrumentation and Measurements	Breadth Core	3
EE3261	Instrumentation and Measurements Lab	Breadth Core	1
HMEE2033	Technical Report Writing	Humanities	3
EE4813	Control Systems	EE Core	3
EE4811	Control Systems Lab	EE Core	1

Semester-VII (16 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
EE4xx3	Depth Elective-I	EE Elective	3
EE4xx1	Depth Elective-I Lab	EE Elective	1
EE4xx3	Depth Elective-II	EE Elective	3
EE4xx1	Depth Elective-II Lab	EE Elective	1
EE4xx3	Depth Elective-III	EE Elective	3
MGTE4xx3	Management Elective-I	Mgt. Elective	3
EE4912	Design Project (Part-I)	Design Project	2

Semester-VIII (17 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
MGTE4xx3	Management Elective-II	Mgt. Elective	3
EE4xx3	Depth Elective-IV	EE Elective	3
EE4xx1	Depth Elective-IV Lab	EE Elective	1
HMEE3xx3	Humanities-II	Humanities	3
EE4xx3	Depth Elective-V	EE Elective	3
EE4924	Design Project (Part-II)	Design Project	4

# MS Electrical Engineering

## ■ Admission Requirements

- (i) A minimum of 16 years of education leading to BS/BE/BSc in Electrical / Electronics / Telecommunications Engineering or equivalent
- (ii) Minimum 2.00/4.00 CGPA or 50% marks
- (iii) Admission Test/HEC Approved Test

## ■ Degree Requirements

A student admitted in this program will have to complete the degree requirements by following any one of the

## ■ Control Systems

Course Title	Code	Cr. Hrs.
Linear System Theory	EE5813	3
Nonlinear Control Systems	EE5823	3
Digital Control Systems	EE5833	3
Control Systems Design	EE5843	3
Robust Control Systems	EE6843	3
Adaptive Control Systems	EE6853	3
LMI in Control	EE6863	3
Sliding Mode Control	EE6893	3
Robotics and Control	EE7833	3
Process Control	EE6873	3
Neuro & Fuzzy Control Systems	EE6883	3
Automotive Control Systems	EE7813	3
Flight Control Systems	EE7823	3
Advanced Nonlinear Control System	EE7843	3
Advanced Topics in Control Engineering	EE78x3	3

options given below:

- (i) 24 Cr. Hrs course work with 6 Cr. Hrs Thesis
- (ii) Course work only (10 Courses)

## ■ Specialization Requirements

A student can claim a specialization if he/she has completed 15 Cr. Hrs. including research work, if opted, from one of the specialization areas mentioned below. Otherwise, on the completion of 30 Cr. Hrs., he/she will be awarded the MS Degree without any specialization.

## ■ Signal Processing

Course Title	Code	Cr. Hrs.
Advanced Digital Signal Processing	EE5613	3
Advanced Digital Image Processing	EE5623	3
Adaptive Signal Processing	EE6633	3
Pattern Recognition	EE6643	3
Radar Signal Processing	EE6673	3
Computer Vision	EE6653	3
Machine Learning	EE6683	3
Robotic Vision	EE6693	3
Filter Banks and Wavelet Theory	EE6683	3
Advanced Analog Filter Design	EE6223	3
Advanced Topics in Computer Vision	EE7613	3
Advanced Topics in Signal Processing	EE7623	3
Medical Image Processing	EE6663	3
Neural Networks and Deep Learning	EE7633	3
Video Encoding and Processing	EE7643	3

## ■ Telecommunications

Course Title	Code	Cr. Hrs.
Principles of Digital Communications	EE5703	3
Stochastic Processes	EE5413	3
Advanced Digital Communications	EE6703	3
Information and Coding Theory	EE5723	3
Advanced Computer Networks	EE6713	3
Cellular and Mobile Communications	EE6733	3
Mobile and Wireless Networks	EE6763	3
Cognitive Radio Communications	EE67x3	3
Multimedia Services Over IP Networks	EE6773	3
Networks Security	EE5733	3
Networks Programming	EE5743	3
Network Architecture Design	EE6783	3
Smart Grid Communication	EE5753	3

Advanced Cryptography	EE5433	3
Advanced Satellite Communications	EE6743	3
Advanced Optical Communications	EE6543	3
Advanced Topics in Computer Networks	EE77x3	3
Advanced Topics in Communications	EE77x3	3
Advanced Antenna Theory and Design	EE6523	3
Software Defined Radios	EE6723	3
Radar Signal Processing	EE6673	3

### ■ Electronics and Microwaves

Course Title	Code	Cr. Hrs.
Solid State Electronics	EE5233	3
Analog Integrated Electronic Circuits	EE6213	3
RF Circuits Design	EE6253	3
Advanced Antenna Theory and Design	EE6523	3
Advanced Microwave Engineering	EE6533	3
Advanced Power Electronics	EE6263	3
Computer-Aided Digital VLSI Design	EE6323	3
Advanced ASIC Design and FPGA	EE6333	3
Embedded Systems Design	EE6343	3
Advanced Electromagnetic Theory	EE5513	3
Advanced Semi-conductor Devices	EE6233	3
Advanced Computer Architecture	EE6313	3
Processing of Semiconductor Devices	EE6353	3
Advanced Topics in Digital Electronics	EE7283	3
Advanced Topics in Electronics & Microwaves	EE7293	3

### ■ Power Systems

Course Title	Code	Cr. Hrs.
Advanced Power System Analysis	EE5113	3
Advanced Electrical Machine Design	EE6133	3
Power System Stability and Control	EE6143	3
Smart Grid	EE6153	3
Renewable Energy Systems	EE6163	3



Advanced Power Electronics	EE6263	3
Advanced Power System Protection	EE5123	3
Advanced Electric Drives	EE5173	3
Advanced Topics in Electrical Power Systems	EE7193	3

### ■ Research Thesis

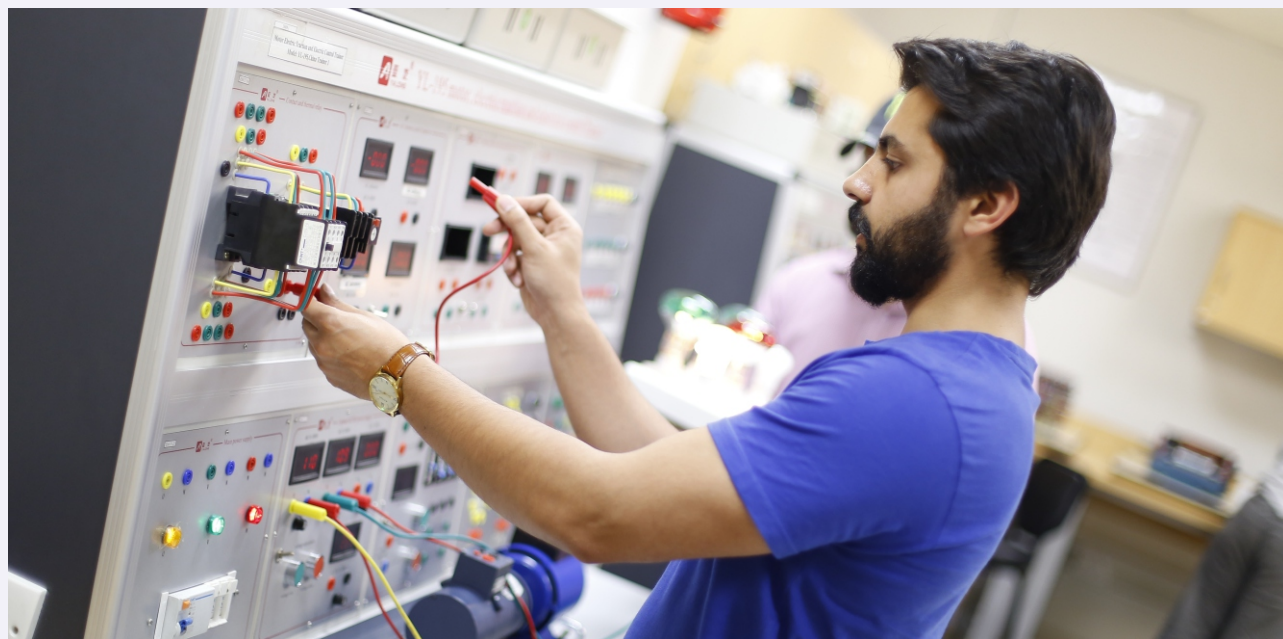
Course Title	Code	Cr. Hrs.
Research Thesis	EE6916	6

### ■ CGPA Requirement

A student is required to earn a minimum 3.00/4.00 CGPA on the completion of his/her degree requirements.

### ■ Program Duration

This is normally a two year program comprising of 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete MS in Electrical Engineering is 4 years.



## PhD Electrical Engineering

The Department of Electrical Engineering is dedicated to continued innovation through its vibrant dynamic environment and competitive research. The department offers PhD program in Electrical Engineering which covers a wide spectrum of fields keeping up with their fast pace of technological advancement. Its carefully designed PhD program aims at producing researchers in the areas of Telecommunications, Control Systems, Signal and Image Processing, Power Systems, Networks and Computer Systems. To achieve this goal, the department has got a team of highly qualified and dedicated faculty members while establishing a strong liaison with research and development organizations and industry.

### ■ Admission Requirements

- (i) MS degree in relevant discipline
- (ii) Minimum CGPA 3.0/4.0 (Semester System) or 60% marks (Annual System)
- (iii) Admission Test/HEC Approved Test

(iv) Interview

### ■ Degree Requirements

A PhD candidate shall be awarded degree on successful completion of the following requirements:

- (i) 18 Cr. Hrs. Course Work with minimum CGPA 3.00/4.00
- (ii) Comprehensive Examination (written and oral)
- (iii) 30 Cr. Hrs. Research Work
- (iv) Synopsis Defense
- (v) Dissertation Foreign Reviews
- (vi) Publication/Acceptance of at least one research paper in HEC approved journal.
- (vii) Dissertation Final Defense

**Note:** PhD scholars are required to comply with the following timeline:

Activity	Preferred Time	Maximum
Course Work	2 Semesters	3 Semesters
Comprehensive Exam	3 Semesters	5 Semesters
Synopsis Qualification	4 Semesters	6 Semesters
Thesis Submission	6 Semesters	10 Semesters

