

# BS Computer Engineering

## ■ Program Educational Objectives (PEOs)

The BS Computer Engineering program aims to produce leading professionals who will:

- (i) Contribute competently in the field of Computer Engineering to fulfill the contemporary requirements of industry or academia both at national and international levels.
- (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 Computer Engineering 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 (F.Sc. Pre-Engineering) or Equivalent with Physics,

Chemistry and Mathematics securing at least 60% marks in aggregate.

OR

Intermediate of Computer Science (ICS) or Equivalent with Physics, Computer Science and Mathematics securing at least 60% marks in aggregate.

OR

Diploma of Associate Engineering in relevant disciplines securing at least 60% marks in aggregate.

- (ii) CUST Admission Test/HEC Approved Test

## ■ Degree Requirements

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

Area	Cr. Hrs.
(a) Humanities Courses	17
(b) Natural Science Courses	21
(c) Computer and Information Science Courses	08
(d) Computer Engineering Foundation Courses	30
(e) Computer Engineering Core (Breadth) Courses	27
(f) Computer Engineering Elective (Depth) Courses	15
(g) Multi Disciplinary Engineering Electives (MDEE)	07
(h) Management Science Courses	05
(i) Internship	00
(j) Community Service	00
(k) Design Project	06
<b>Total</b>	<b>136</b>

### ■ Humanities Courses (17 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Islamic Studies	HCPE1002	2
Pakistan Studies	HCPE1012	2
Functional English	HCPE1023	3
Communication Skills	HCPE1033	3
Technical Report Writing	HCPE2043	3
Social Sciences I: Professional Ethics	HCPE3052	2
Social Sciences II: Engineering Economics	HCPE3062	2

### ■ Natural Science Courses (21 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Calculus and Analytical Geometry	MCPE1013	3
Linear Algebra	MCPE1033	3
Applied Differential Equations	MCPE1043	3
Complex Variables and Transforms	MCPE2053	3
Numerical Analysis	MCPE3073	3
Applied Physics	PCPE1012	2
Applied Physics Lab	PCPE1011	1
Probability and Statistics	CPE2063	3

### ■ Computer and Information Science Courses (8 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Introduction to Computing	CCPE1102	2
Introduction to Computing Lab	CCPE1111	1
Computer Programming	CCPE1122	2
Computer Programming Lab	CCPE1121	1
Discrete Structures	CCPE2052	2

### ■ Computer Engineering Foundation Courses (30 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Engineering Drawing	CPE1011	1
Workshop Practice	CPE1021	1
Circuit Analysis	CPE1213	3
Circuit Analysis Lab	CPE1211	1
Digital Logic Design	CPE2313	3
Digital Logic Design Lab	CPE2311	1
Object Oriented Programming	CPE2123	3
Object Oriented Programming Lab	CPE2121	1
Electronic Devices and Circuits	CPE2233	3
Electronic Devices and Circuits Lab	CPE2231	1
Data Structures and Algorithms	CPE2133	3
Data Structures and Algorithms Lab	CPE2131	1
Signals and Systems	CPE2613	3
Signals and Systems Lab	CPE2611	1
Computer Architecture and Organization	CPE2323	3
Computer Architecture and Organization Lab	CPE2321	1

### ■ Computer Engineering Core (Breadth) Courses (27 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Computer Communication Networks	CPE4713	3
Computer Communication Networks Lab	CPE4711	1
Microprocessors and Interfacing	CPE3333	3
Microprocessors and Interfacing Lab	CPE3331	1
Operating Systems	CPE3413	3
Operating Systems Lab	CPE3411	1
Database Management Systems	CPE4513	3
Database Management Systems Lab	CPE4511	1
Software Engineering	CPE4523	3
Digital Signal Processing	CPE3623	3
Digital Signal Processing Lab	CPE3621	1
Digital System Design	CPE3343	3
Digital System Design Lab	CPE3341	1

### ■ Computer Engineering Elective (Depth) Courses (15 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Artificial Intelligence	CPE3633	3
Artificial Intelligence Lab	CPE3631	1
Digital Image Processing	CPE3643	3
Digital Image Processing Lab	CPE3641	1
Systems Programming	CPE4143	3
Systems Programming Lab	CPE4141	1
Embedded Systems	CPE4353	3
Embedded Systems Lab	CPE4351	1
Internet of Things	CPE4733	3
Internet of Things Lab	CPE4731	1
Control Systems	CPE4813	3
Control Systems Lab	CPE4811	1
Cloud and Distributed Computing	CPE4543	3
High Performance Computing	CPE4553	3
Computer Vision	CPE4653	3
Design and Analysis of Algorithms	CPE4153	3
Network and Cyber Security	CPE4743	3

### ■ Multi Disciplinary Engineering Elective (MDEE) (7 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Analog and Digital Communications	ECPE3712	2
Analog and Digital Communications Lab	ECPE3711	1
Block Chain Technologies and Applications	CCPE4573	3
Computer Graphics	CCPE3423	3
Data Mining	CCPE4223	3
Mobile Application Development	CCPE4193	3
Robotics and Automation	ECPE4823	3
Applied Thermodynamics	MCPE1113	3
Occupational Health & Safety	HCPE1071	1

### ■ Management Science Courses (5 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Entrepreneurship	HCPE4072	2
Engineering Management	HCPE4503	3
Leadership	HCPE4112	2
Project Management	HCPE4063	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 Computer 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)	CPE4913	3
Design Project (Part-II)	CPE4923	3

### ■ Industrial Internship (CPE4000)

Each student is required to complete an 8-week industrial internship training usually after 6 semesters or on the completion of 90 Cr. Hrs.

### ■ Community Service (VIS4000)

Each student is required to complete 60 hours community work, usually after 4<sup>th</sup> semester which would be a prerequisite for the award of degree.

### ■ CGPA Requirement

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

### ■ 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 Computer Engineering degree is 07 years.

**Note:** Degree requirements may be modified from time to time as per the directions of the concerned regulatory body.

# SCHEME OF STUDIES

## BS Computer Engineering Program

### □ Semester-I (16 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
MCPE1013	Calculus and Analytical Geometry	Natural Sciences	3
HCPE1002	Islamic Studies	Humanities	2
CCPE1102	Introduction to Computing	Comp. & Info. Science	2
CCPE1111	Introduction to Computing Lab	Comp. & Info. Science	1
PCPE1012	Applied Physics	Natural Sciences	2
PCPE1011	Applied Physics Lab	Natural Sciences	1
HCPE1023	Functional English	Humanities	3
CPE1021	Workshop Practice	Eng. Foundation	1
HCPE1071	Occupational Health and Safety	Multi Disp. Eng.	1

### □ Semester-II (18 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
MCPE1033	Linear Algebra	Natural Sciences	3
CPE1213	Circuit Analysis	Eng. Foundation	3
CPE1211	Circuit Analysis Lab	Eng. Foundation	1
CCPE1122	Computer Programming	Comp. & Info. Science	2
CCPE1121	Computer Programming Lab	Comp. & Info. Science	1
HCPE1033	Communication Skills	Humanities	3
HCPE1012	Pakistan Studies	Humanities	2
MCPE1043	Applied Differential Equations	Natural Sciences	3

### □ Semester-III (18 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
CPE2313	Digital Logic Design	Eng. Foundation	3
CPE2311	Digital Logic Design Lab	Eng. Foundation	1
CPE2123	Object Oriented Programming	Eng. Foundation	3
CPE2121	Object Oriented Programming Lab	Eng. Foundation	1
CPE2233	Electronic Devices and Circuits	Eng. Foundation	3
CPE2231	Electronic Devices and Circuits Lab	Eng. Foundation	1
MCPE2053	Complex Variables and Transforms	Natural Sciences	3
CCPE2052	Discrete Structures	Comp. & Info. Science	2
CPE1011	Engineering Drawing	Eng. Foundation	1

#### □ Semester-IV (18 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
CPE2133	Data Structures and Algorithms	Eng. Foundation	3
CPE2131	Data Structures and Algorithms Lab	Eng. Foundation	1
CPE2613	Signals & Systems	Eng. Foundation	3
CPE2611	Signals & Systems Lab	Eng. Foundation	1
CPE2323	Computer Arch. and Organization	Eng. Foundation	3
CPE2321	Computer Arch. and Organization Lab	Eng. Foundation	1
CPE2063	Probability and Statistics	Natural Sciences	3
HCPE2043	Technical Report Writing	Humanities	3

#### □ Semester-V (17 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
CPE3333	Microprocessor and Interfacing	Major Core (Breath)	3
CPE3331	Microprocessor and Interfacing Lab	Major Core (Breath)	1
CPE3623	Digital Signal Processing	Major Core (Breath)	3
CPE3621	Digital Signal Processing Lab	Major Core (Breath)	1
CPE3713	Computer Communication Networks	Major Core (Breath)	3
CPE3711	Computer Communication Networks Lab	Major Core (Breath)	1
XCPE4xx3	MDEE-I	Multi Disp. Eng.	3
HCPE3xx2	Social Science Elective-I	Humanities	2

#### □ Semester-VI (18 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
CPE3343	Digital System Design	Major Core (Breath)	3
CPE3341	Digital System Design Lab	Major Core (Breath)	1
CPE3xx3	Depth Elective-I	Depth Elective	3
CPE3xx1	Depth Elective-I Lab	Depth Elective	1
CPE3413	Operating Systems	Major Core (Breath)	3
CPE3411	Operating Systems Lab	Major Core (Breath)	1
MCPE3073	Numerical Analysis	Natural Sciences	3
HCPE3xx3	Mgt. Sci. Elective - I	Mgt. Sciences	3

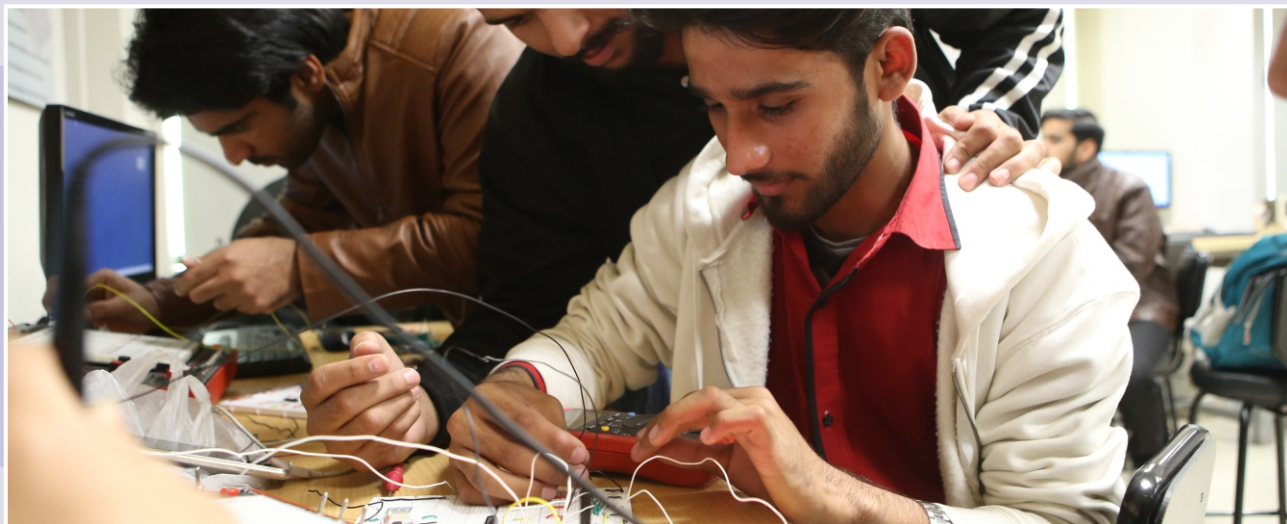


### □ Semester-VII (16 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
HCPE4xx2	Mgt. Sci. Elective - II	Mgt. Sciences	2
CPE4513	Database Management System	Major Core (Breath)	3
CPE4511	Database Management System Lab	Major Core (Breath)	1
CPE4xx3	Depth Elective-II	Depth Elective	3
CPE4xx1	Depth Elective-II Lab	Depth Elective	1
CPE4523	Software Engineering	Major Core (Breath)	3
CPE4913	Design Project –I	Design Project	3

### □ Semester-VIII (15 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
HCPE4xx2	Social Science Elective-II	Humanities	2
CPE4xx3	Depth Elective-III	Depth Elective	3
CPE4xx1	Depth Elective-III Lab	Depth Elective	1
CPE4xx3	Depth Elective-IV	Depth Elective	3
CPE4923	Design Project –II	Design Project	3
XCPE4xx3	MDEE-II	Multi Disp. Eng.	3



# 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

### □ Semester-VII (16 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
EE4193	Power & System Analysis and Protection	EE Core	3
EE4191	Power & System Analysis and Protection Lab	EE Core	1
EE4273	ASIC & Design and FPGA	EE Core	3
EE4271	ASIC & Design and FPGA Lab	EE Core	1
EE4xx3	EE Elective	EE Elective	3
MGTE4xx3	Management Elective-II	Mgt. Elective	3
EE4912	Design Project (Part-I)	Design Project	2

### □ Semester-VIII (15 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
EE4293	Power Electronics	EE Core	3
EE4291	Power Electronics Lab	EE Core	1
EE4813	Linear Control Systems	EE Core	3
EE4811	Linear Control Systems Lab	EE Core	1
HMEE3xx3	Humanities-II	Humanities	3
EE4924	Design Project (Part-II)	Design Project	4



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 (F.Sc. Pre-Engineering) or Equivalent with Physics, Chemistry and Mathematics securing at least 60% marks in aggregate.

OR

Intermediate of Computer Science (ICS) or Equivalent with Physics, Computer Science and Mathematics securing at least 60% marks in aggregate.

OR

Diploma of Associate Engineering in relevant disciplines securing at least 60% marks in aggregate.

- (ii) CUST Admission Test/HEC Approved Test

### ■ Degree Requirements

Each candidate for the BS Electrical Engineering degree is required to successfully earn 135 credit hours (Cr. Hrs.) as per the following detail:

Area	Cr. Hrs.
(a) Humanities Courses	19
(b) Natural Science Courses	16
(c) Computing Courses	09
(d) Management Science Courses	06
(e) Inter Disciplinary Engineering Electives (IDEE)	05
(f) Foundation Courses	27
(g) Core and Specialization Courses	44
(h) Technical Elective	03
(i) Internship	00
(j) Community Service	00
(k) Design Project	06
<b>Total</b>	<b>135</b>

### ■ Humanities Courses (19 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Pakistan Studies	HMEE1002	2
Functional English	HMEE1013	3
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 (16 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

### ■ 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	MGTE4103	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) (5 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	MEEE3031	1
Occupational Health and Safety	EE1031	1

### ■ Foundation Courses (27 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
Electromagnetic Fields & Waves	EE2513	3
Probability and Random Variables	EE2413	3

### ■ Core and Specialization Courses (44 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Electronics Circuit Design	EE2233	3
Electronics Circuit Design Lab	EE2231	1
Microprocessor and Computer Architecture	EE3323	3
Microprocessor and Computer Architecture Lab	EE3321	1
Communication Systems	EE3713	3
Communication Systems Lab	EE3711	1
Electrical Machines	EE3283	3
Electrical Machines Lab	EE3281	1
Artificial Intelligence	EE4693	3
Artificial Intelligence Lab	EE4691	1
Instrumentation and Measurements	EE3263	3
Instrumentation and Measurements Lab	EE3261	1
Power Generation Transmission and Distribution	EE3123	3
Power Generation Transmission and Distribution Lab	EE3121	1
Power System Analysis and Protection	EE4193	3
Power System Analysis and Protection Lab	EE4191	1
ASIC Design and FPGA	EE4273	3
ASIC Design and FPGA Lab	EE4271	1
Linear Control Systems	EE4813	3

Linear Control Systems Lab	EE4811	1
Power Electronics	EE4293	3
Power Electronics Lab	EE4291	1

### ■ Technical Elective Courses (3 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Electric Vehicles	EE4413	3
Embedded Systems	EE3333	3
Digital Signal Processing	EE4623	3
Computer Vision	EE4683	3
Digital Image Processing	EE4633	3
High Voltage Engineering	EE4813	3
Internet of Things	EE4423	3
Network Design & Management	EE4763	3
Industrial Electronics	EE4263	3
Smart Grid & Renewable Energy Systems	EE4433	3
Microwave Engineering	EE4523	3
Antenna Theory & Design	EE4533	3
Numerical Analysis	EE2403	3
Computer Communication Networks	EE4713	3
Wireless Communication	EE4733	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.

### ■ 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.

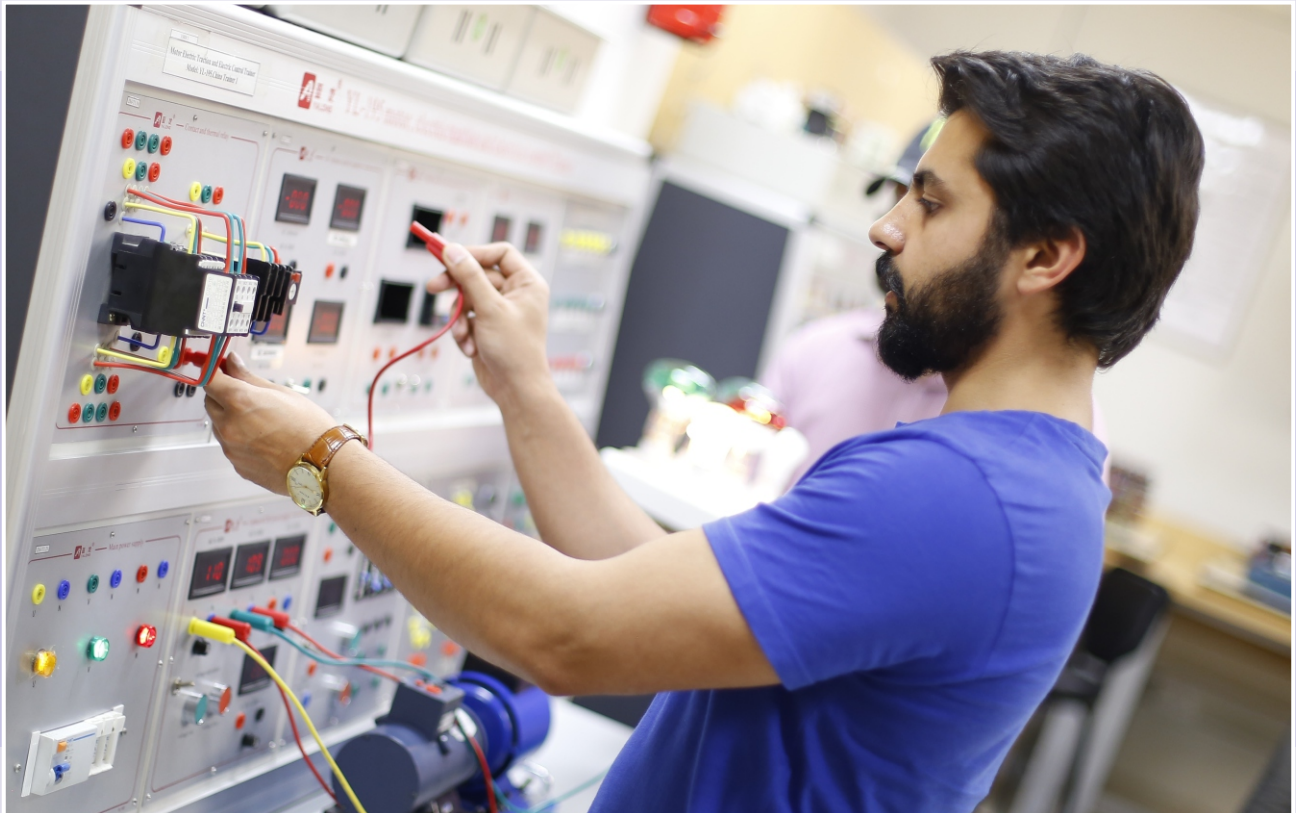
### ■ CGPA Requirement

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

### ■ 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.

**Note:** Degree requirements may be modified from time to time as per the directions of the concerned regulatory body.



# SCHEME OF STUDIES

## BS Electrical Engineering Program

### □ Semester-I (16 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
HMEE1002	Pakistan Studies	Humanities	2
HMEE1013	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
EE1031	Occupational Health & Safety	IDEE	1

### □ Semester-II (17 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
HMEE1023	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.
EE3323	Microprocessor and Computer Architecture	EE Core	3
EE3321	Microprocessor and Computer Architecture Lab	EE Core	1
EE2413	Probability and Random Variables	EE Foundation	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
MGTE4xx3	Management Elective-I	Mgt. Elective	3

□ Semester-V (18 Cr. Hrs)

Course Code	Course Title	Category	Cr. Hrs.
HMEE3xx3	Humanities-I	Humanities	3
ME/CE3xx3	IDEE-1	IDEE	3
ME/CE3xxI	IDEE-1 Lab	IDEE	1
EE3283	Electrical Machines	EE Core	3
EE3281	Electrical Machines Lab	EE 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.
HMEE2012	Islamic Studies	Humanities	2
EE3123	Power Generation Transmission and Distribution	EE Core	3
EE3121	Power Generation Transmission and Distribution Lab	EE Core	1
EE3263	Instrumentation and Measurements	EE Core	3
EE3261	Instrumentation and Measurements Lab	EE Core	1
HMEE2033	Technical Report Writing	Humanities	3
EE4693	Artificial Intelligence	EE Core	3
EE4691	Artificial Intelligence Lab	EE Core	1

# 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 options given below:

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

The students are required to register courses offered by the department from the list appended below:

Course Title	Category	Code	Cr. Hrs.
Linear System Theory	Control Systems	EE5813	3
Nonlinear Control Systems	Control Systems	EE5823	3
Advanced Digital Control Systems	Control Systems	EE6833	3
Control Systems Design	Control Systems	EE5843	3
Robust Control Systems	Control Systems	EE6843	3
Sliding Mode Control	Control Systems	EE6893	3
Advanced Robotics	Control Systems	EE7843	3
Advanced Digital Signal Processing	AI and Computer Vision	EE5613	3
Advanced Digital Image Processing	AI and Computer Vision	EE5623	3
Adaptive Signal Processing	AI and Computer Vision	EE6633	3
Pattern Recognition	AI and Computer Vision	EE6643	3
Computer Vision	AI and Computer Vision	EE6653	3
Machine Learning	AI and Computer Vision	EE6683	3
Advanced Artificial Intelligence	AI and Computer Vision	EE6363	3
Neural Networks and Deep Learning	AI and Computer Vision	EE7633	3
Video Encoding and Processing	AI and Computer Vision	EE7643	3
Statistical Data Analysis & Hypothesis Testing	AI and Computer Vision	EE5453	3
Principles of Digital Communications	Telecommunications	EE5703	3

Stochastic Processes	Telecommunications	EE5413	3
Advanced Digital Communications	Telecommunications	EE6703	3
Information and Coding Theory	Telecommunications	EE5723	3
Advanced Computer Networks	Telecommunications	EE6713	3
Cellular and Mobile Communications	Telecommunications	EE6733	3
Mobile and Wireless Networks	Telecommunications	EE6763	3
Multimedia Services Over IP Networks	Telecommunications	EE6773	3
Networks Security	Telecommunications	EE5733	3
Software Defined Radios	Telecommunications	EE6723	3
Radar Signal Processing	Telecommunications	EE6673	3
Analog Integrated Electronic Circuits	Electronics and Microwave	EE6213	3
Advanced Antenna Theory and Design	Electronics and Microwave	EE6523	3
Advanced Microwave Engineering	Electronics and Microwave	EE6533	3
Advanced Power Electronics	Electronics and Microwave	EE6263	3
Advanced ASIC Design and FPGA	Electronics and Microwave	EE6333	3
Advanced Semi-conductor Devices	Electronics and Microwave	EE6233	3
Advanced Computer Architecture	Electronics and Microwave	EE6313	3
Advanced Power System Analysis	Power Systems	EE5113	3
Power System Stability and Control	Power Systems	EE6143	3
Smart Grid	Power Systems	EE6153	3
Renewable Energy Systems	Power Systems	EE6163	3
Advanced Power System Protection	Power Systems	EE5123	3
Advanced Electric Drives	Power Systems	EE5173	3
Advanced Electric Vehicles	Power Systems	EE5183	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/GAT General/HEC 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
- (iii) 30 Cr. Hrs. Research Work
- (iv) Synopsis Defense
- (v) Dissertation Foreign Reviews
- (vi) Publication of research paper(s) 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	6 Semesters
Synopsis Qualification	4 Semesters	6 Semesters
Thesis Submission	6 Semesters	12 Semesters