FACULTY OF ENGINEERING

DEAN'S MESSAGE

Dr. Imtiaz Ahmad Taj

The Faculty of Engineering aims to produce engineers and researchers who are equipped with the knowledge and expertise to meet the challenges of the dynamic and evolving engineering domains. To achieve this objective, a team of highly qualified and dedicated faculty members is available.

This faculty holds unlimited promise to daring students who are keen to try out engineering as a profession. Academic programs offered by the faculty are supported by well-equipped labs which strengthen the applied aspect of the discipline and provide hands-on skills to future engineers and researchers. A number of well reputed research groups exist in the Faculty of Engineering, which are doing extensive applied research on novel ideas and industrial problems, in close collaboration of R&D organizations and industry, and supported by the national and international funding agencies.

Faculty of Engineering comprises of three departments; the Department of Electrical Engineering, the Department of Mechanical Engineering and the Department of Civil Engineering. All these three Departments offer programs at BS, MS and PhD levels. Additionally the Department of Mechanical Engineering offers the MS in the discipline of Engineering Management. So far the Faculty has graduated over 800 students in various engineering programs.

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

■ **Dr. Imtiaz Ahmad Taj**
PhD Electronics & Inf. Engineering (Hokkaido University, Sapporo, Japan)
MS Electronics & Information Engineering (Hokkaido University, Sapporo, Japan)
Professor / Dean FoE

■ **Dr. Noor Muhammad Khan**
PhD Electrical Engineering (UNSW, Australia)
BS Electrical Engineering (UET, Lahore)
Professor/HoD EE

■ **Dr. Fazal-ur-Rahman**
PhD Control Systems (McGill University, Canada)
Master of Engg., Control Sys (McGill University, Canada)
MSc Mathematics (BZU Multan)
Professor

■ **Dr. Aamer Iqbal Bhatti**
PhD Industrial Control Systems (Leicester University, UK)
MSc Control Systems (Imperial College London, UK)
BS Electrical Engineering (UET, Lahore, Pakistan)
Professor / Dean ORIC

■ **Dr. Muhammad Ashraf**
PhD Systems Engineering (University of Liverpool, UK)
MSc Engineering (PIEAS, Islamabad)
Professor

■ **Dr. Raza Samar**
PhD Control System Engineering (University of Leicester, UK)
MS Electronic Engineering (Stanford Uni. Stanford, CA, USA)
Professor

■ **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 (LUMS Lahore)
BS Electrical Engineering (University of Engineering and Technology, Lahore)
Assistant Professor

■ **Mr. Umer Maqbool**
MS Communication Systems (University of Hert Fordshire, UK)
BS Electronic Engineering (Institute of space Technology)
Assistant Professor

■ **Mr. Muhammad Naeem**
MS Electrical Power & Control Engineering (CASE, Islamabad)
BSc Electrical Power Engineering (Islamia University of Bahawalpur)
Lecturer

■ **Qazi Abdul Moqueet**
MS Engineering Management (University of Engineering and Technology, Taxila)
BS Electrical Telecommunication (COMSATS, Islamabad)
Lecturer

■ **Mr. Inam Elahi**
MPhil English Linguistics (University of Lahore)
Post Graduate Diploma (AIOU, Islamabad)
MA English Literature (UET Lahore)
Lecturer

■ **Mr. Osama Akbar Raja**
MS Electronic Engineering (Mohammad Ali Jinnah University, Islamabad)
BS Electronic Engineering (M.A.J.U, Islamabad)
Lecturer

■ **Mr. Muhammad Moin Qasim**
MS Electronic Engineering (CUST, Islamabad)
BS Electronic Engineering (M.A.J.U, Islamabad)
Lecturer

■ **Mr. Umer Farooq Ahmed**
MS Electronic Engineering (CUST, Islamabad)
BS Electrical Engineering (COMSATS, Islamabad)
Lecturer

■ **Mr. Muhammad Waleed Farooq**
MS Electronic Engineering (CUST, Islamabad)
BS Electronic Engineering (M.A.J.U, Islamabad)
Junior Lecturer

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

■ **Mr. Amir Hamza**
BS Electrical Engineering (COMSATS)
Lab Engineer

■ **Mr. Mudassir Hussain**
BS Electrical Engineering (UET, Taxila)
Lab Engineer

■ **Mr. Nadir Mehmood**
BS Electronic Engineering (University of Engineering and Technology, Peshawar)
Lab Engineer

■ **Mr. Soban Ahmed**
BS Electrical Engineering (CUST, Islamabad)
Lab Engineer

■ **Mr. Umair Rafique**
MS Electrical Engineering (Capital University of Science and Technology, Islamabad)
BS Electrical Engineering (Mohammad Ali Jinnah University, Islamabad)
Research Associate

■ **Mr. Jahanzeb Malik**
MS Electrical Engineering (CUST Islamabad)
BS Electrical Engineering (Bahria University, Islamabad)
Research Associate

Department of Mechanical Engineering

■ **Dr. Muhammad Mahabat Khan**
PhD (University of EcoleCentrale de Lyon, France)
MSc Advance Mechanical Engineering (Uni of Leeds, UK)
BEng Mechatronics Engineering (Air University, Islamabad)
Associate Professor / HoD

■ **Dr. Irfan Anjum Manarvi**
PhD Design Manufacture and Engg. Management (Uni. of Strathclyde, Glasgow, UK)
MPhil Design Manufacture and Engg. Management (Uni. of Strathclyde, Glasgow, UK)
Professor

■ **Dr. Mohammad Javed Hyder**
PhD Mechanical Engineering, Rensselear Poloytechnic Institue (RPI), Troy NY, USA
MS (Mechanical Engineering) George Washington Uni. USA
Professor

■ **Dr. Khawar Naveed Abbasi**
PhD Nuclear Engineering (University of London)
MSc Nuclear Engineering (QAU Islamabad)
BE Mechanical Engineering (Mehran University Jamshoro)
Assistant Professor

■ **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

■ **Dr. Muhammad Irfan**
PhD Mechanical Engineering (KOC University, Istanbul, Turkey)
MS Mechanical Engineering (PIEAS, Islamabad)
BSc Hons (University of Engineering and Technology, Taxila)
Assistant Professor

■ **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

■ **Dr. Salman Sagheer Warsi**
PhD Design Manufacturing Engineering (NUST)
MS Design Manufacture and Management (University of Durham, United Kingdom)
BSc Mechanical Engineering (UET, Taxila)
Assistant Professor

■ **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

■ **Mr. Saif Ullah**
MS Mechatronics Engineering (University of Southern Denmark)
BSc Honors Mechanical Engineering (Islamic University of Technology - Dhaka)
Assistant Professor

■ **Mr. Atif Bin Asghar**
MS Mechanical Engineering (University of Leeds, United Kingdom)
BE Mechanical Engineering (UET, Taxila)
Assistant Professor

■ **Mr. Khalid Mahmood**
MSc Engineering Management (UET, Taxila)
BE Avionics Engineering (CAE PAF Academic, Risalpur)
Assistant Professor

■ **Mr. Tauseef Ahmed**
MS Mechanical Engineering (NUST, Islamabad)
BE Mechanical Engineering (NUST, Islamabad)
Assistant Professor

■ **Mr. Muhammad Talha Jamal Solaija**
MS Mechatronics (College of E&ME NUST, Rawalpindi)
BSc Mechatronics (Wah Engineering College, Uni. of Wah)
Lecturer

■ **Mr. Obaid Ullah Khan**
MSc Mechanical Engineering (UET Taxila)
BSC Mechanical Engineering (U.E.T. Taxila)
Lecturer

■ **Ms. Shummaila Rasheed**
MS Mechanical Engineering (CUST, Islamabad)
BSc Mechanical Engineering (UET, Lahore)
Lecturer

■ **Mr. Muhammad Rizwan Siddiqui**
MS Mechanical Engineering (GIKI, Topi Swabi, KP)
BS Mechanical Engineering (HITEC, Taxila)
Lecturer

■ **Raja Awais Liaqait**
Bachelor in Mechanical Engineering (CUST)
Lab Engineer

■ **Mr. Muhammad Ahmed**
BS Mechanical Engineering (CUST, Islamabad)
Lab Engineer

■ **Ms. Shermeen Hamid**
BS Mechanical Engineering (CUST, Islamabad)
Lab Engineer

■ **Mr. Rehan Qaiser Mustafa**
BS Mechanical Engineering (M.A.J.U, Islamabad)
Lab Engineer

■ **Mr. Saqib Amir**
BS Mechanical Engineering (M.A.J. U, Islamabad)
Lab Engineer

■ **Mr. Sanan Saqib**
BS Mechanical Engineering (MAJU)
Lab Engineer

■ **Mr. Zain ul Abdeen**
BS Mechanical Engineering (CUST, Islamabad)
Lab Engineer

■ **Mr. Fakhar ul Hasnain**
BS Mechanical Engineering (MAJU, Islamabad)
Lab Engineer

■ **Mr. Ahmed Jamal**
BS Mechanical Engineering (UET, Taxila)
Lab Engineer

Department of Civil Engineering

■ **Dr. Ishtiaq Hassan**
PhD Water Resources and Irrigation Engg. (UET, Taxila)
MSc Water Resources and Irrigation Engg. (UET, Taxila)
BSc Civil Engineering (UET, Taxila)
Associate Professor/ HoD

■ **Dr. Majid Ali**
PhD Civil Engineering (University of Auckland, New Zealand)
MSc Structural Engineering (UET, Taxila)
BSc Civil Engineering (UET, Taxila)
Professor

■ **Dr. Syed Shujaa Safdar Gardezi**
PhD Construction and Project Management (University Teknologi PETRNAS Malaysia)
MSc Engineering Management (UET, Taxila)
BSc Civil Engineering (UET, Taxila)
Assistant Professor

■ **Mr. Muhammad Usman Farooqi**
MSc Civil Engineering (UET, Taxila)
BSc Civil Engineering (UET, Taxila)
Assistant Professor

■ **Ms. Sana Gul**
MS Structural Engineering (NUST, Islamabad)
BE Civil Engineering (UET, Peshawar)
Lecturer

■ **Ms. Faiza Khalid**
MS Structural Engineering (UET, Taxila)
BS Civil Engineering (UET, Taxila)
Lecturer

■ **Syed Shujaul Hassan**
MSc Civil Engineering (University Teknologi PETRONAS, Malaysia)
BE Civil Engineering (NUST, Islamabad)
Lecturer

■ **Mr. Iqbal Ahmad**
MS Civil Engineering (CUST, Islamabad)
BS Civil Engineering (UET, Peshawar)
Lecturer

■ **Mr. Abdul Qadeer**
MS Construction Engineering and Management (NUST, Islamabad)
BS Civil Engineering (UET, Taxila)
Lecturer

■ **Mr. Muhammad Wajahat Ali Khawaja**
MSc Transportation / Highway Engg. (UET, Peshawar)
Bachelor in Civil Engineering (UET, Peshawar)
Lecturer

■ **Mr. Huzaifah Zahran**
MS Water Engineering (University of Sheffield, UK)
BS Civil Engineering (NUST, Islamabad)
Lecturer

■ **Mr. Muhammad Umer Jadoon**
MS Geotechnical Engineering (NUST, Islamabad)
BS Civil Engineering (University of Engineering and Technology, Peshawar)
Lecturer

■ **Mr. Talha Bin Tahir**
MS Structural Engineering (NUST, Islamabad)
BS Civil Engineering (NUST, Risalpur)
Lecturer

■ **Mr. Shaheed Ullah**
MS Structural Engineering (NUST, Islamabad)
BSc Civil Engineering (UET, Peshawar)
Lecturer

■ **Mr. Sohail Afzal**
BS Civil Engineering (The University of Lahore, Islamabad)
Lab Engineer

■ **Mr. Muiez Basit Ali**
BS Civil Engineering (CUST, Islamabad)
Lab Engineer

■ **Mr. Mehran Sudheer**
BS Civil Engineering (Capital University of Science and Technology, Islamabad)
Lab Engineer

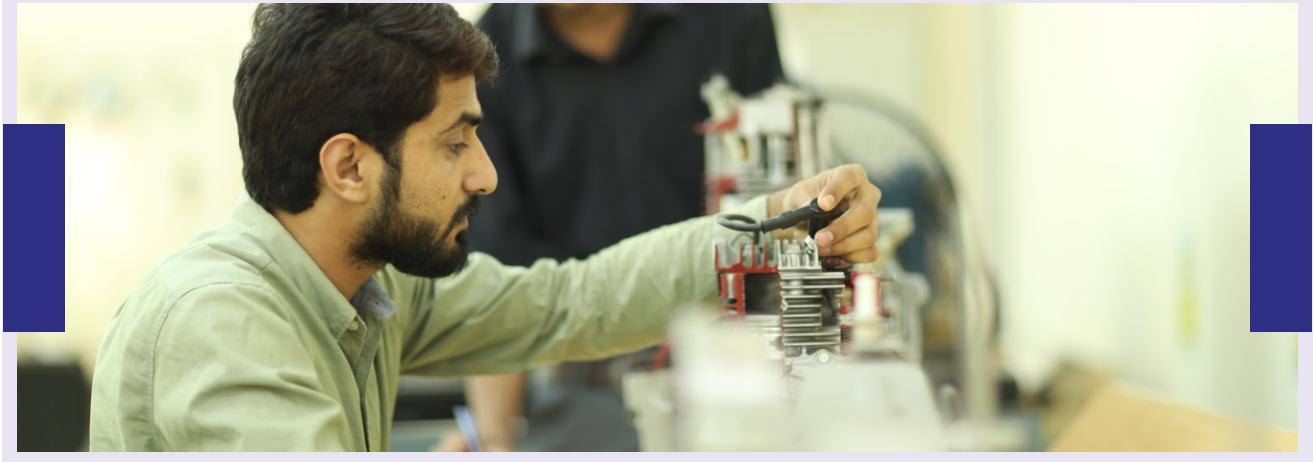
■ **Ms. Kainat Batool**
BS Civil Engineering (Capital University of Science and Technology, Islamabad)
Lab Engineer

■ **Mr. Usman Hussain**
BSc Civil Engineering (University of Engineering and Technology, Taxila)
Lab Engineer

■ **Mr. Muhammad Talha Azhar**
Bachelor of Civil Engineering (NUST, Islamabad)
Lab Engineer

■ **Mr. Umair Ahmed**
BS Civil Engineering (Capital University of Science and Technology, Islamabad)
Lab Engineer

■ **Mr. Talha Ahmed**
BS Civil Engineering (Capital University of Science and Technology, Islamabad)
Lab Engineer



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
	Total	**136**

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

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
Applied Mechanics Lab	MEEE2021	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

Course Title	Code	Cr. Hrs.
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

Course Title	Code	Cr. Hrs.
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.

Community Service (VIS4000)

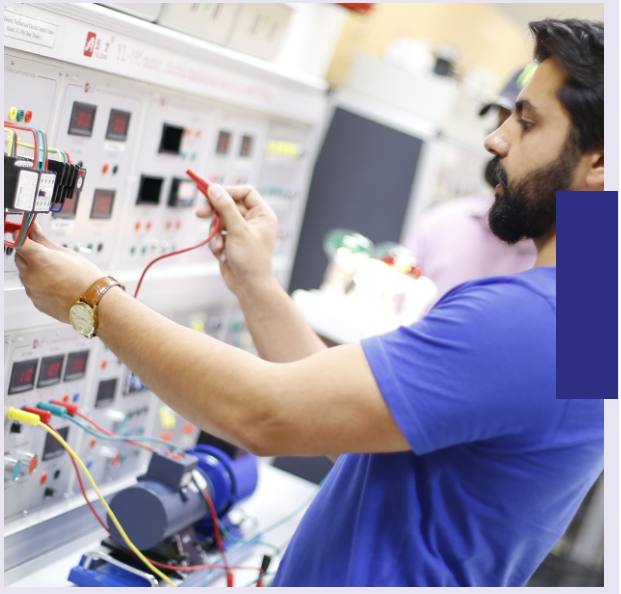
Each student is required to complete 65 hours community work, usually after 4^{th} semester which would be a prerequisite for the award of degree.

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.



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.
MEE3323	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.
EE4xx3	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 options given below:

(i) 24 Cr. Hrs course work with 6 Cr. Hrs Thesis

(ii) 27 Cr. Hrs course work with 3 Cr. Hrs Project

(iii) 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.

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

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 Digital Electronics	EE7283	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	EE5123	3
Advanced Topics in Electrical Power Systems	EE7193	3

Research Thesis/Project

Course Title	Code	Cr. Hrs.
Research Thesis	EE6916	6
Research Project	EE6913	3

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

DEPARTMENT OF MECHANICAL ENGINEERING

HOD'S MESSAGE

Dr. Muhammad Mahabat Khan

At Mechanical Engineering department, an excellent educational experience is designed to sharpen the students' talents and skills through a cutting edge course work. Department allows its students to build knowledge across the breadth of the discipline while concentrating in depth, on a particular area of specialization. The infrastructure of the department is pivotal to its vision of multi-disciplinary education and research. It comprises state of the art and well equipped teaching and research laboratories, workshops, lecture halls and faculty offices. The department offers a 4-year BS degree in Mechanical Engineering along with MS and PhD in Mechanical Engineering and a MS degree in Engineering Management with different specializations in all graduate programs. As Mechanical Engineering is closely intertwined with the industry and business, these programs are aimed to provide opportunities to create industrial linkages and act as a bridge for flow of the cross-disciplinary knowledge among all departments.

The phenomenal growth observed in automobile and aerospace industry, in recent past, is primarily based on the advancement of Mechanical Engineering knowledge. A degree in Mechanical Engineering gives knowledge and skills to be involved in the design, development and manufacturing of products, machines and mechanical engineering systems, including engines and turbines, land transport vehicles, ships, aircrafts, building services (air conditioning, pumps, fans), refrigeration systems, manufacturing processes and industrial plants.

BS Mechanical Engineering

■ Program Educational Objectives (PEOs)

The BS Mechanical Engineering Program aims to produce leading professionals who will:

(i) Apply knowledge and skills to provide sustainable solutions to challenging Mechanical Engineering problems in industry and academia.

(ii) Demonstrate professional growth and exhibit continual improvement in learning modern engineering techniques and their applications in practice.

(iii) Make positive contribution towards society by strong ethical values, communication skills and leadership.

■ Program Learning Outcomes (PLOs)

At the time of graduation, the graduates of BS(ME) 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 Mechanical Engineering degree is required to successfully earn 136 credit hours (Cr. Hrs.) as per the following detail:

	Area	Cr. Hrs.
(a)	Foundation Courses	33
(b)	Natural Science Courses	20
(c)	Computing Courses	03
(d)	Breadth Courses	25
(e)	Depth Courses	14
(f)	Humanities Courses	15
(g)	Management Science Courses	05
(h)	Inter Departmental Engineering Electives (IDEE)	06
(i)	Mechanical Engineering Electives	09
(j)	Design Project	06
(k)	Internship	00
(l)	Community Work	00
	Total	**136**

■ Foundation Courses (33 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Engineering Materials	ME1413	3
Workshop-I	ME1801	1
Workshop-II	ME1811	1
Thermodynamics-I	ME1113	3
Engineering Drawing & Graphics	ME1011	1
Engineering Drawing & Graphics Lab	ME1021	1
Engineering Statics	ME1213	3
Engineering Dynamics	ME2223	3
Mechanics of Materials-I	ME2233	3
Fluid Mechanics-I	ME2513	3
Mechanics of Machines	ME2033	3
Precision Engineering & Metrology	ME3312	2
Manufacturing Processes	ME3613	3
Engineering Mechanics Lab	ME2221	1
Manufacturing Processes Lab	ME3611	1
Precision Engineering & Metrology Lab	ME3311	1

■ Natural Science Courses (20 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Calculus & Analytical Geometry	MTME1013	3
Applied Differential Equations	MTME1043	3
Complex Variables & Transforms	MTME2053	3
Linear Algebra & Numerical Analysis	MTME2063	3
Engineering Statistics	MTME3073	3
Applied Physics	PHME1012	2
Applied Physics lab	PHME1011	1
Applied Chemistry	CHME1012	2

■ Computing Courses (3 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Computer Systems & Programming	CSME1012	2
Computer Systems & Programming lab	CSME1011	1

■ Breadth Courses (25 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Thermodynamics-II	ME2123	3
Mechanics of Materials-II	ME3243	3
Fluid Mechanics-II	ME3523	3
Machine Design-I	ME3043	3
Machine Design-II	ME3052	2
Heat & Mass Transfer	ME3133	3
Introduction to Finite Element Methods	ME3062	2
Heat & Mass Transfer Lab	ME3131	1
Thermodynamics Lab	ME2121	1
Mechanics of Materials Lab	ME3241	1
Fluid Mechanics Lab	ME3521	1
omputer Aided Designing (CAD) Lab	ME3051	1
Introduction to Finite Element Methods Lab	ME3061	1

■ Depth Courses (14 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Internal Combustion Engines	ME4142	2
Refrigeration & Air Conditioning	ME4153	3
Mechanical Vibrations	ME4253	3
Power Plants	ME4173	3
Internal Combustion Engines Lab	ME4141	1
Refrigeration & Air Conditioning Lab	ME4151	1
Mechanisms and Mechanical Vibrations Lab	ME4261	1

■ Humanities Courses (16 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Functional English	HMME1013	3
Communications Skills	HMME1023	3
English-III (Technical Report Writing)	HMME3033	3
Pakistan Studies	HMME1002	2
Islamic Studies/Ethics	HMME1012	2
Social Science	HMME3xx2	2

■ Management Science Courses (5 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Management Elective-I	HMME3xx2	2
Management Elective-II	HMME4xx2	2
Health, Safety & Environment	HMME3761	1

■ Inter Departmental Engineering Electives (IDEE) (9 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Electrical Engineering	EEME2742	2
Electrical Engineering Lab	EEME2741	1
Electronics Engineering	EEME2752	2
Electronics Engineering Lab	EEME2751	1
Control Engineering	EEME4012	2
Control Engineering Lab	EEME4011	1

■ Mechanical Engineering Electives (6 Cr. Hrs.)

Students are required to take 6 Cr. Hrs. as elective courses. These are depth courses. A list of technical elective courses is given below:

Course Title	Code	Cr. Hrs.
Renewable Energy Technology	ME4163	3
Gas Dynamics	ME4533	3
Aerodynamics	ME4543	3
Machining & Automation	ME4623	3

Introduction to Mechatronics	ME4423	3
Introduction to Robotics	ME4443	3
Computational Fluid Dynamics with lab	ME4553	3
CAD/CAM	ME4073	3

■ Management Elective Courses (04 Cr. Hrs)

Students are required to take 04 Cr. Hrs. as management elective courses. A list of management elective courses is given below:

Course Title	Code	Cr. Hrs.
Engineering Economics	HMME3xx2	2
Total Quality Management	HMME4xx2	2
Project Management	HMME4xx2	2
Productions and Operations Management	HMME4xx2	2

■ 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 mechanical 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)	ME4913	3
Design Project (Part-II)	ME4923	3

■ Industrial Internship (ME4000)

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.

■ Community Work (VIS4000)

Each student is required to complete 65 hours community work, usually after 4^{th} 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 Mechanical Engineering degree is 07 years.

SCHEME OF STUDIES

BS Mechanical Engineering Program

☐ Semester-I (17 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
MTME1013	Calculus & Analytical Geometry	Natural Sciences	3
PHME1012	Applied Physics	Natural Sciences	2
PHME1011	Applied Physics Lab	Natural Sciences	1
HMME1013	English-I (Functional English)	Humanities	3
CHME1012	Applied Chemistry	Natural Sciences	2
CSME1012	Computer System & Programming	Computing	2
CSME1011	Computer System & Programming Lab	Computing	1
ME1801	Workshop Practice-I	Foundation	1
HMME1002	Pakistan Studies	Humanities	2

☐ Semester-II (18 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
EEME2742	Electrical Engineering	IDEE	2
EEME2741	Electrical Engineering Lab	IDEE	1
MTME1043	Applied Differential Equations	Natural Sciences	3
ME1113	Thermodynamics-I	Foundation	3
ME1011	Engineering Drawing & Graphics	Foundation	1
ME1021	Engineering Drawing & Graphics Lab	Foundation	1
ME1213	Engineering Statics	Foundation	3
ME1811	Workshop Practice-II	Foundation	1
ME1413	Engineering Materials	Foundation	3

☐ Semester-III (17 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
HMME1023	English-II (Communication Skills)	Humanities	3
EEME2752	Electronic Engineering	IDEE	2

EEME2751	Electronic Engineering Lab	IDEE	1
ME2233	Mechanics of Materials-I	Foundation	3
ME2123	Thermodynamics-II	Breadth	3
ME2121	Thermodynamics-II Lab	Breadth	1
ME2223	Engineering Dynamics	Foundation	3
ME2221	Engineering Mechanics Lab	Foundation	1

☐ **Semester-IV (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MTME2063	Linear Algebra & Numerical Analysis	Natural Sciences	3
HMME1012	Islamic Studies	Humanities	2
ME3243	Mechanics of Materials-II	Breadth	3
ME3241	Mechanics of Materials Lab	Breadth	1
ME2513	Fluid Mechanics-I	Foundation	3
ME2033	Mechanics of Machines	Foundation	3
ME3312	Precision Engineering & Metrology	Foundation	2
ME3311	Precision Engineering & Metrology Lab	Foundation	1

☐ **Semester-V (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MTME2033	Complex Variables & Transforms	Natural Sciences	3
HMME3XX2	Social Science	Humanities	2
ME3523	Fluid Mechanics-II	Breadth	3
ME3521	Fluid Mechanics-II Lab	Breadth	1
ME3613	Manufacturing Processes	Foundation	3
ME3611	Manufacturing Processes Lab	Foundation	1
ME3043	Machine Design -I	Breadth	3
HMME3xx2	Management Elective-I	Mgmt Elective	2

☐ **Semester-VI (17 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MTME3073	Engineering Statistics	Natural Sciences	3
HMME2003	English-III (Technical Report Writing)	Humanities	3
HMME3761	Health, Safety & Environment	Mgmt. Sciences	1
ME3133	Heat & Mass Transfer	Breadth	3
ME3131	Heat & Mass Transfer Lab	Breadth	1
ME3052	Machine Design -II	Breadth	2
ME3062	Introduction to Finite Element Methods	Breadth	2
ME3061	Introduction to Finite Element Methods Lab	Breadth	1
ME3051	Computer Aided Designing (CAD) Lab	Breadth	1

☐ **Semester-VII (16 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EEME4012	Control Engineering	IDEE	2
EEME4011	Control Engineering Lab	IDEE	1
ME4142	IC Engine	Depth	2
ME4141	IC Engine Lab	Depth	1
ME4153	Refrigeration & Air Conditioning	Depth	3
ME4151	Refrigeration & Air Conditioning Lab	Depth	1
ME4xx3	Technical Elective-I	Depth	3
ME 4913	Design Project (Part-I)	Design Project	3

☐ **Semester-VIII (15 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
ME4253	Mechanical Vibrations	Depth	3
ME4251	Mechanisms and Mechanical Vibrations Lab	Depth	1
ME4173	Power Plants	Depth	3
ME4xx3	Technical Elective Course-II	Depth	3
HMME4xx2	Management Elective-II	Mgmt Elective	2
ME4923	Design Project (Part-II)	Design Project	3

MS Mechanical Engineering

■ Admission Requirements

(i) A minimum of 16 years of education leading to BS/BE in Mechanical Engineering/Aerospace/Avionics 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) 27 Cr. Hrs. course work with 3 Cr. Hrs. Project

(iii) 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.

■ Mechanical Design

Course Title	Code	Cr. Hrs.
Theory of Elasticity	ME5013	3
Experimental Stress Analysis	ME5023	3
Continuum Mechanics	ME5033	3
Advanced Engineering Materials	ME5043	3
Advanced Mechanical Vibration	ME6003	3
Advanced Solid Mechanics	ME6013	3
Fracture Mechanics	ME6063	3
Advanced Mechanical Design	ME6073	3
Finite Elements Methods	ME5003	3

■ Thermal Science

Course Title	Code	Cr. Hrs.
Internal Combustion Engines	ME5113	3
Thermal Power Generation	ME5123	3
Gas Dynamics	ME5133	3
Energy Conversion	ME5143	3

Combustion	ME5153	3
Conduction Heat Transfer	ME5203	3
Convective Heat Transfer	ME5213	3
Thermal Design of Heat Exchangers	ME5223	3
Radiation Heat Transfer	ME5233	3
Computational Heat Transfer	ME5243	3
Advanced Fluid Mechanics	ME5503	3
Computational Fluid Dynamics	ME5513	3
Fluid Mixing & Separation	ME5523	3
Transport Phenomena	ME5533	3
Viscous Flow	ME5543	3
Advanced Engineering Thermodynamics	ME5103	3

■ Manufacturing

Course Title	Code	Cr. Hrs.
Computer Integrated Manufacturing	ME5613	3
Mechanism Design	ME5623	3
Automation & Control	ME5633	3
Digital Manufacture & Rapid Manufacture	ME5643	3
Manufacturing System Design & Analysis	ME5653	3
Production Planning & Control	ME5673	3
Operations Research	ME5683	3
Material Selection & Design	ME6603	3
Robotics & Manufacturing Automation	ME6633	3
Advanced CAD/CAM	ME5603	3
Product Design & Development	ME5663	3
Product Design & Development	ME5663	3

■ Elective Courses

Course Title	Code	Cr. Hrs.
Theory of Plates & Shells	ME6033	3
Design of Machine Tools	ME6043	3

Tribology	ME6053	3
Engineering Plasticity	ME6083	3
Mechanics of Composite Materials	ME6093	3
Solar Energy Utilization	ME6103	3
Energy Management	ME6113	3
Advanced Propulsion	ME6123	3
Renewable Energy Technologies	ME6133	3
Energy Systems	ME6143	3
Advanced Heat & Mass Transfer	ME6203	3
Boiling & Condensation Heat Transfer	ME6213	3
Industrial Air Conditioning & Refrigeration	ME6223	3
Design of Industrial Boilers & Furnaces	ME6233	3
Fuel Cell Technology	ME6243	3
Turbulent Flow	ME6503	3
Boundary Layer Theory	ME6513	3
Two Phase Flow	ME6523	3
Kinetic Theory of Gases	ME6533	3
Theory of Granular Flows	ME6543	3
Aerodynamics	ME6553	3
Modern Manufacturing Processes	ME6613	3
Gradient Optimization Techniques	ME6623	3
Nano Fabrication & Manufacturing	ME6643	3
Quality Engineering & Management	ME6653	3
Product Life Cycle Management	ME6663	3
Productivity Engineering	ME6673	3
Experimental Methods	ME5723	3
Scheduling & Sequencing	ME6683	3
Theory of Metal Cutting	ME6693	3
Research Methodologies for Engineers	ME5703	3
Optimization Methods for Engineers	ME5713	3
Experimental Methods	ME5723	3

■ Research Thesis/Project

Course Title	Code	Cr. Hrs.
Research Thesis	ME6916	6
Research Project	ME6913	3

■ 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 Mechanical Engineering is 4 years.

MS Engineering Management

■ Admission Requirements

(i) A minimum of 16 years of education leading to BS Degree in Engineering/Applied Sciences 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) 27 Cr. Hrs. course work with 3 Cr. Hrs. Project

(iii) Course work only (10 Courses)

■ Core Courses

Students are required to qualify all the core courses listed below:

Course Title	Code	Cr. Hrs.
Engineering Management Techniques	EM6113	3
Operation Research	EM6323	3
Finance & Accounting for Engineering	EM6213	3
Research Methodologies for Engineers	EM6413	3

■ Elective Courses

Students are required to take 12 or 15 or 18 Cr. Hrs. from the list of elective courses given below:

Course Title	Code	Cr. Hrs.
Production Planning & Control	EM6333	3
Supply Chain Management	EM6343	3
Industrial Safety & Maintenance Management	EM6373	3
Manufacturing Strategy	EM6353	3
Product Design & Development	EM6363	3
Project Risk Assessment & Decision Analysis	EM6433	3
Project Management Information Systems	EM6443	3
Project Scheduling, Planning & Control	EM6463	3
Software Matrices	EM6513	3
Software Quality Management	EM6523	3
Software Requirements Engineering	EM6533	3

Software Risk & Configuration Management	EM6543	3
Innovation in Market Place	EM6713	3
Quality & Productivity Improvement	EM6133	3
Management of Project Based Organization	MPM6113	3
Project Process, Planning & Control	MPM6123	3
Project Monitoring & Evaluation	MPM6133	3
Engineering Project Management	EM6113	3
Entrepreneurial Basic Plan Preparation	EM6733	3
Competitive Strategies in Technology Management	EM6773	3
Environmental & Energy Management	EM6763	3
Technology Management	EM6703	3
Transfer of Technology	EM6753	3
Environment Impact Assessment	CE6723	3
Data Analysis & Quality Control	CE5403	3
Advanced Construction Management	CE5803	3
Advanced Project Management for Construction Projects	CE5823	3
Construction & Safety Management	CE5833	3
Construction Economics & Financial Management	CE6853	3
Sustainability in Construction Projects	CE6873	3
Manufacturing System Design & Analysis	ME5653	3
Optimization Methods for Engineers	ME5713	3

■ Research Thesis/Project

Course Title	Code	Cr. Hrs.
Research Thesis	EM6916	6
Research Project	EM6913	3

■ 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

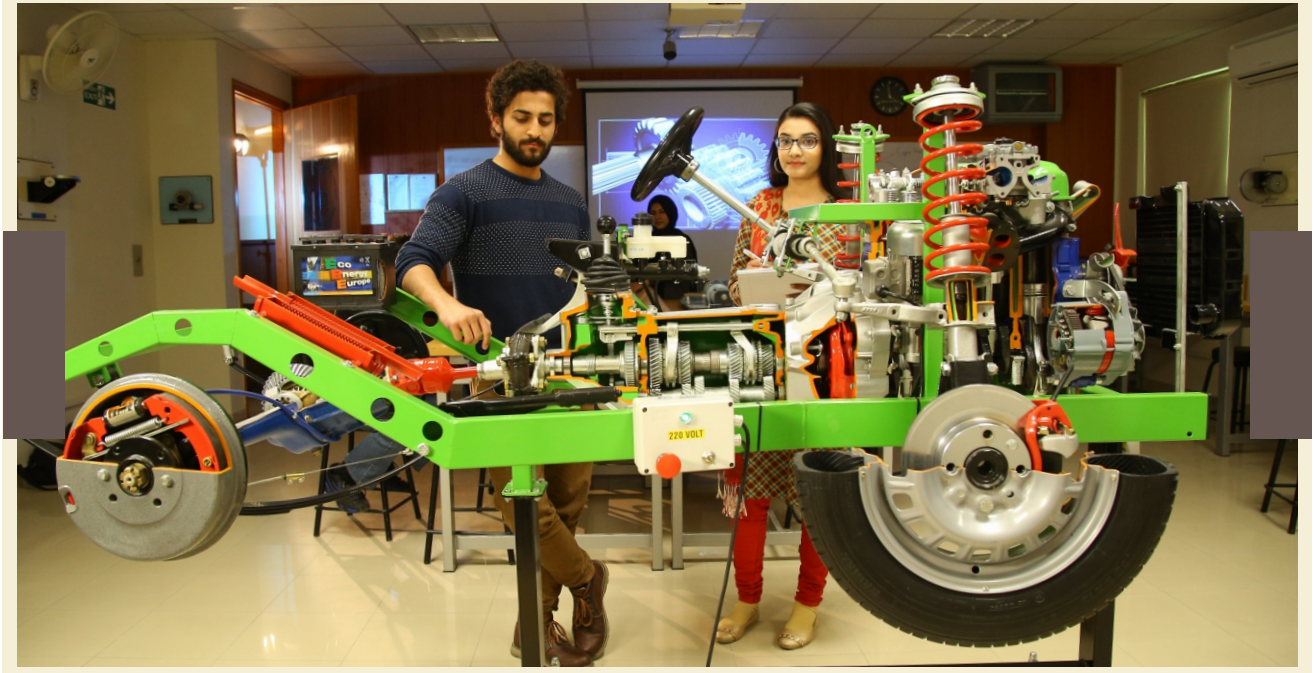
This is normally a two years program comprising of 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete MS in Engineering Management is 4 years.

Note: The following courses are cross listed with MS Project Management.

Engineering Management	Project Management
Finance & Accounting for Engineers	Financial Management
Project Scheduling, Planning & Control	Project Process, Planning & Control
Engineering Project Management	Advanced Project Management
Project Risk Assessment & Decision Analysis	Project Risk Management

Note: The following courses are cross listed with MS Civil Engineering.

Engineering Management	Civil Management
Project Scheduling, Planning & Control	Project Planning & Control
Project Risk Assessment & Decision Analysis	Project Risk Management
Engineering Project Management	Advanced Project Management for Construction Projects
Finance & Accounting for Engineers	Construction Economics & Financial Management



PhD Mechanical Engineering

The PhD program in Mechanical Engineering is designed to deliver students a broad background in mechanical engineering and related technologies. The program mission is to impart knowledge through a comprehensive and advanced curriculum followed with intense research training so that the graduating PhDs are fully prepared for industrial and technological challenges of future. The students are expected to tackle complex engineering and technological problems through a professional approach by utilizing advanced tools and techniques under the guidance of professional, dedicated and research focused faculty members.

Mechanical engineering department provides students the opportunity to conduct research in Mechanical Design; Thermo-fluids and Manufacturing system. The Department has a close liaison with the industry and R&D organizations to support and foster research activities.

■ 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

DEPARTMENT OF CIVIL ENGINEERING

HOD'S MESSAGE

Dr. Ishtiaq Hassan

The Department of Civil Engineering is dedicated to produce quality professional engineers with abilities to design, manage and operate Civil Engineering based fields. These objectives are achieved through OBE (Outcome Based Education) system as per Washington Accord. The Department of Civil Engineering through outstanding faculty and state of the art lab facilities ensures that the engineers of tomorrow are not only well equipped theoretically but also have hands-on training of modern engineering tools, e.g. European made 20,000 kN Servo-Hydraulic Machine (UTM), European made flow channel, Italian made 50 kN tension/compression tri-axial machine, etc. A highly conducive environment including not only class and lab learning but also co-curricular activities, enables the student to grow professionally as well as personally & ethically.

The department is also offering graduate program in four specializations areas. There are three major research groups where the faculty is actively involved in research activities. The MS/PhD students are associated with these research groups that give them the practical experience and flavor of modern technological research.

BS Civil Engineering

■ Program Educational Objectives (PEOs)

The graduates of BS Civil Engineering program will become professionals who will:

(i) Ensure quality while applying civil engineering practices and will exhibit professional expertise at national and international level.

(ii) Enhance and improve their knowledge and skills through professional growth and development activities.

(iii) Serve the society and engineering profession in an ethical manner, considering social, environmental, national and global concerns.

■ Program Learning Outcomes (PLOs)

At the time of graduation, the graduates of BS(CE) 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 Civil Engineering degree is required to complete successfully 136 credit hours (Cr. Hrs.) as per the following details:

	Area	Cr. Hrs.
(a)	Natural Sciences Courses	21
(b)	Humanities Courses	15
(c)	Management Science Courses	08
(d)	Computing Courses	09
(e)	Foundation Courses	27
(f)	Breadth Courses	20
(g)	Depth Courses	23
(h)	Interdisciplinary Courses	07
(i)	Design Project (Part-I & II)	06
(j)	Industrial Internship	00
(k)	Survey Camp	00
(l)	Community Service	00
	Total	**136**

Natural Sciences Courses (21 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Calculus and Analytical Geometry	MTCE1013	3

Engineering Geology	CE1313	3
Applied Differential Equation	MTCE1043	3
Engineering Mechanics	CE1213	3
Engineering Economics	MTCE1111	1
Probability and Statistics	MTCE3072	2
Numerical and Complex Analysis	MTCE2063	3
Geo Informatics	CE3131	1
Engineering Mechanics Lab	CE1211	1
Geo Informatics Lab	CE3191	1

■ Humanities Courses (15 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Pakistan Studies	HMCE1002	2
Islamic Studies/Ethics	HMCE2012	2
Functional English	HMCE1113	3
Communication Skills	HMCE2123	3
Technical Report Writing	HMCE2133	3
Professional Ethics	HMCE4032	2

■ Management Science Courses (8 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Construction Management	CE3833	3
Hydrology and Water Resource Management	CE3543	3
Hazards and Disaster Management	CE4831	1
Hydrology and Water Resource Management Lab	CE3541	1

■ Computing Courses (9 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Computer Programming	CSCE1012	2
Civil Engineering Drawing and Graphics	CE2021	1
Quantity Surveying and Estimation	CE3033	3

Computer Programming Lab	CSCE1011	1
Civil Engineering Drawing and Graphics Lab	CE2022	2

■ Foundation Courses (27 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Civil Engineering Materials	CE1412	2
Engineering Drawing	CE1011	1
Engineering Surveying	CE1112	2
Fluid Mechanics	CE2513	3
Mechanics of Solids	CE2223	3
Construction Engineering	CE2811	1
Soil Mechanics	CE3323	3
Structural Analysis-I	CE2423	3
Civil Engineering Materials Lab	CE1411	1
Engineering Drawing Lab	CE1012	2
Engineering Surveying Lab	CE1182	2
Fluid Mechanics Lab	CE2511	1
Mechanics of Solids Lab	CE2221	1
Construction Engineering Lab	CE2891	1
Soil Mechanics Lab	CE3321	1

■ Breadth Courses (20 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Advanced Engineering Surveying	CE2122	2
Structural Analysis-II	CE3433	3
Advanced Fluid Mechanics	CE2523	3
Transportation Planning & Engineering	CE3613	3
Plain and Reinforced Concrete-I	CE3443	3
Environmental Engineering-I	CE3713	3
Advanced Engineering Surveying Lab	CE2121	1

Advanced Fluid Mechanics Lab	CE3521	1
Plain and Reinforced Concrete-I Lab	CE3441	1

Depth Courses (23 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Earthquake-resistant Design of Concrete Structures	CE4461	1
Geotechnical and Foundation Engineering	CE3333	3
Plain and Reinforced Concrete-II	CE3453	3
Highway and Traffic Engineering	CE4623	3
Environmental Engineering-II	CE4721	1
Steel Structures	CE4473	3
Hydraulics and Irrigation Engineering	CE4533	3
Earthquake-resistant Design of Concrete Structures Lab	CE4491	1
Geotechnical and Foundation Engineering Lab	CE3331	1
Plain and Reinforced Concrete-II Lab	CE3451	1
Highway and Traffic Engineering Lab	CE4621	1
Hydraulics and Irrigation Engineering Lab	CE4531	1
Environmental Engineering-II Lab	CE4791	1

Interdisciplinary Courses (07 Cr. Hrs)

Course Title	Code	Cr. Hrs.
Basic Electrical Engineering	EECE1011	1
Basic Mechanical Engineering	MECE2011	1
Architectural and Town Planning	CE4823	3
Basic Electrical Engineering Lab	EECE1091	1
Basic Mechanical Engineering Lab	MECE2091	1

Design Project (6 Cr. Hrs)

After the completion of 90 Cr. Hrs., the students are required to register for Design Project (Part-I) of 2 Cr. Hrs. in the 7^{th} semester of their degree program. Design Project (Part-II) of 4 Cr. Hrs. can be taken in next semester provided Design Project (Part-I) is passed.

Course Title	Code	Cr. Hrs.
Design Project (Part-I)	CE4912	2
Design Project (Part-II)	CE4924	4

Industrial Internship (CE4000)

Each student is required to complete 8 weeks industrial internship training usually after 6^{th} semesters or on the completion of 90 Cr. Hrs. The internship shall be graded as pass/fail.

Survey Camp (CE4930)

Students are required to register, attend and successfully complete a minimum of 2 weeks Survey Camp following the fourth semester of their degree program. Course CE2122 is a pre-requisite for Survey Camp. A formal evaluation will be carried out and Pass/Fail grade will be awarded to the students.

Community Service (VIS4000)

Each student is required to complete 65 hours community work, usually after 1^{st} 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 Civil Engineering degree is 07 years.

SCHEME OF STUDIES
BS Civil Engineering Program

☐ Semester-I (17 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
HMCE1002	Pakistan Studies	Humanities	2
HMCE1113	Functional English	Humanities	3
MTCE1013	Calculus and Analytical Geometry	Natural Sciences	3
CE1313	Engineering Geology	Natural Sciences	3
CE1412	Civil Engineering Materials	CE Foundation	2
CE1011	Engineering Drawing	CE Foundation	1
CE1411	Civil Engineering Materials Lab	CE Foundation	1
CE1012	Engineering Drawing Lab	CE Foundation	2

☐ Semester-II (17 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
EECE1011	Basic Electrical Engineering	IDEE	1
CSCE1012	Computer Programming	Computing	2
MTCE1043	Applied Differential Equation	Natural Sciences	3
CE1213	Engineering Mechanics	Natural Sciences	3
CE1112	Engineering Surveying	CE Foundation	2
MTCE1111	Engineering Economics	Natural Sciences	1
EECE1091	Basic Electrical Engineering Lab	IDEE	1
CSCE1011	Computer Programming Lab	Computing	1
CE1211	Engineering Mechanics Lab	Natural Sciences	1
CE1182	Engineering Surveying Lab	CE Foundation	2

☐ Semester-III (18 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
HMCE2123	Communication Skills	Humanities	3
HMCE2012	Islamic Studies	Humanities	2
MECE2011	Basic Mechanical Engineering	IDEE	1

CE2223	Mechanics of Solids	CE Foundation	3
CE2513	Fluid Mechanics	CE Foundation	3
CE2122	Advanced Engineering Surveying	Breadth	2
MECE2091	Basic Mechanical Engineering Lab	IDEE	1
CE2221	Mechanics of Solids Lab	CE Foundation	1
CE2511	Fluid Mechanics Lab	CE Foundation	1
CE2121	Advanced Engineering Surveying Lab	Breadth	1

☐ Semester-IV (18 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
HMCE2133	Technical Report Writing	Humanities	3
CE2021	Civil Engineering Drawing and Graphics	Computing	1
MTCE2063	Numerical and Complex Analysis	Natural Sciences	3
CE2811	Construction Engineering	CE Foundation	1
CE2423	Structural Analysis-I	CE Foundation	3
CE2523	Advanced Fluid Mechanics	Breadth	3
CE2022	Civil Engineering Drawing & Graphics Lab	Computing	2
CE2891	Construction Engineering Lab	CE Foundation	1
CE2521	Advanced Fluid Mechanics Lab	Breadth	1

☐ Semester-V (18 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
MTCE3072	Probability and Statistics	Natural Sciences	2
CE3131	Geo Informatics	Natural Sciences	1
CE3713	Environmental Engineering-I	Breadth	3
CE3433	Structural Analysis-II	Breadth	3
CE3323	Soil Mechanics	CE Foundation	3
CE3443	Plain and Reinforced Concrete-I	Breadth	3
CE3321	Soil Mechanics Lab	CE Foundation	1
CE3441	Plain and Reinforced Concrete-I Lab	Breadth	1
CE3191	Geo Informatics Lab	Natural Sciences	1

☐ Semester-VI (18 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
CE3033	Quantity Surveying and Estimation	Computing	3
CE3543	Hydrology & Water Resources Management	Management	3
CE3613	Transportation Planning and Engineering	Breadth	3
CE3453	Plain and Reinforced Concrete-II	Depth	3
CE3333	Geotechnical and Foundation Engineering	Depth	3
CE3541	Hydrology & Water Resources. Management Lab	Management	1
CE3451	Plain & Reinforced Concrete-II Lab	Depth	1
CE3331	Geotechnical & Foundation Engineering Lab	Depth	1

☐ Semester-VII (15 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
CE4823	Architecture and Town Planning	IDEE	3
CE4461	Earthquake-resistant Design of Concrete Structures	Depth	1
CE4623	Highway and Traffic Engineering	Depth	3
CE4831	Hazards and Disaster Management	Management	1
CE4833	Construction Management	Management	3
CE4491	Earthquake-resistant Design of Concrete Structures Lab	Depth	1
CE4621	Highway and Traffic Engineering Lab	Depth	1
CE4912	Civil Engineering Design Project (Part-I)	Design Project	2

☐ Semester-VIII (15 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
HMCE4032	Professional Ethics	Humanities	2
CE4721	Environmental Engineering-II	Depth	1
CE4473	Steel Structures	Depth	3
CE4533	Hydraulics and Irrigation Engineering	Depth	3
CE4531	Hydraulics & Irrigation Engineering Lab	Depth	1
CE4791	Environmental Engineering-II Lab	Depth	1
CE4924	Civil Engineering Design Project (Part-II)	Design Project	4


Bigg Boss

MS Civil Engineering

■ Program Educational Objectives (PEOs)

The graduate of MS Civil Engineering will become professional, who will:

(i) Ensure quality while applying advanced civil engineering practices and will excel in professional expertise at national and international level.

(ii) Enhance and improve their in-depth analysis and investigate skills through excellence in applied research.

(iii) Serve the society and engineering profession following rules of ethics and considering social, environmental, national and global concerns.

■ Program Learning Outcomes (PLOs)

(i) **Design/Development of Solutions:** An ability to design appropriate solutions for engineering problems and design systems, components or processes that meet specified needs with the use of the modern tools.

(ii) **Investigation and Research:** An ability to investigate engineering problems at advanced levels 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.

(iii) **Societal Impact and Lifelong Learning:** An ability to apply reasoning informed by contextual knowledge to assess societal, health, safety, cultural and environmental issues for sustainable development and solution to complex engineering problems leading to innovation and technological development.

(iv) **Communication, Ethics and Project Management:** An ability to demonstrate effective communication and management skills by applying engineering principles and rules of ethics to one's own work, as a member and / or leader in a team.

■ Admission Requirements

(i) A minimum of 16 years of education leading to BS/BE/BSc in Civil Engineering or equivalent in a relevant area.

(ii) Minimum 2.00/4.00 CGPA or 50% marks

(iii) Admission Test/HEC Approved Test

** Applicants with undergraduate degree from non-civil engineering areas may be required to take some undergraduate courses to fulfill pre-requisite deficiencies as determined by the Graduate Admission Committee. The deficiency Cr. Hrs. will not be counted towords the minimum Cr. Hrs. requirement for the award of the MS degree.*

■ 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) 27 Cr. Hrs course work with 3 Cr. Hrs Project

(iii) Course work only (10 Courses)

■ Specialization Courses

A student can claim a specialization if he/she has completed 15 Cr. Hrs. including research work, if opted, from one of the specialization area courses offered by the department. Otherwise, on the completion of 30 Cr. Hrs, he/she will be awarded the MS Transcript without any specialization.

Water Resource Engineering and Management (WRE & M)

Course Title	Code	Cr. Hrs.
Advanced Open Channel Hydraulics	CE5103	3
Advanced Hydrology	CE5113	3
River Engineering	CE6123	3
Design of Hydraulic Structures	CE6133	3
Advanced Hydraulics	CE5143	3
Drainage and Irrigation Engineering	CE5153	3
Sediment Transport	CE5163	3
Stochastic Hydrology	CE5173	3
Ground Water Development/Exploration	CE5183	3
Hydro Power Development	CE6193	3
Flood Risk Assessment	CE6203	3
Water Management Computations	CE6213	3

Structural Engineering (SE)

Course Title	Code	Cr. Hrs.
Dynamics of Structures	CE5303	3
Fiber Reinforced Composites	CE5313	3
Computer Aided Analysis and Design of Structures	CE6323	3
Earthquake Engineering	CE6333	3
Structural Design Practice	CE5343	3
Matrix Analysis of Structures	CE5353	3
Bridge Engineering	CE5363	3
Pre-stressed Concrete theory and Practice	CE6373	3
Domes, Shells and Space Structures	CE5383	3
Properties of Concrete and its constituents	CE5393	3
Advanced Steel Structures	CE6403	3
Finite Element Methods for Structural Analysis	CE5413	3
Structural Fire Engineering	CE6423	3
Instability of Structures	CE6433	3
Seismic Design of Structures	CE6443	3

Performance Based Seismic Design	CE6453	3
Design of Tall Structures	CE6443	3

■ Construction Engineering and Management

Course Title	Code	Cr. Hrs.
Advanced Construction Management	CE5803	3
Project Planning and Control	CE5813	3
Advanced Project Management for Construction Projects	CE5823	3
Construction and Safety Management	CE5833	3
Advanced Civil Engineering Practices	CE5843	3
Construction Economics and Financial Management	CE6853	3
Construction Contracts for Civil Engineers	CE6863	3
Sustainability in Construction Projects	CE6873	3
Engineering Management Techniques	CE6883	3
Project Risk Assessment and Decision Analysis	CE6893	3

■ Environmental Engineering

Course Title	Code	Cr. Hrs.
Solid Waste Management	CE5703	3
Environmental Engineering	CE6713	3
Environmental Impact Assessment (EIA)	CE6723	3
Water Supply & Wastewater Engineering	CE6733	3
Water Quality Management	CE6743	3

■ Elective Courses

Course Title	Code	Cr. Hrs.
Advanced Topics in Civil Engineering	CE5003	3
Application of Modern Tools in Civil Engineering	CE5013	3
Data Analysis and Quality Control	CE5023	3
Dam Engineering	CE5033	3
Advanced Geo-Informatics	CE5043	3

Research Methods in Civil Engineering	CE6053	3
Disaster Risk Assessment and Evaluation	CE6063	3
Advanced Geotechnical Engineering	CE6503	3
Deep Foundations	CE6513	3
Foundation Engineering	CE6523	3
Rock Mechanics	CE6533	3
Infrastructure Design and Development	CE6603	3
Pavement Evaluation and Rehabilitation	CE6613	3
Traffic Engineering	CE6623	3
Principles of Pavement Engineering	CE6633	3
Highway Planning and Design	CE6643	3

■ Research Thesis/Project

Course Title	Code	Cr. Hrs.
Research Thesis	CE6916	6
Research Project	CE6913	3

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

PhD Civil Engineering

Civil Engineering is the profession that dates back with the old civilizations. It always kept on growing and developed exciting outcomes all over the world. The new trends in Civil Engineering have played a pivotal role in the new era of construction, intelligent building systems, urban development, irrigation systems, highway construction, infrastructure planning etc. All these technological advancements would not have been possible without the research in several offshoots of the Civil Engineering.

The PhD program of Civil Engineering Department, through a close liaison with industry and R&D organizations, is designed to provide excellent research environment to its PhD Scholars.

■ 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


ibertest
IBMU4-2000
www.ibertest.com
ibertest