

# Faculty of Engineering



**Prof. Dr. Muhammad Akram Tahir**  
Dean

*The Faculty of Engineering, University of Central Punjab (UCP) takes fair pride in the quality of its instructions at the undergraduate as well as the graduate level. Our faculty members take delight in conveying the excitement of academic discovery both at the introductory level, where our students master concepts and critical thinking, and at the more advanced level, where students discover the rewards and rigors of research. Pakistan Engineering Council (PEC) and Higher Education Commission (HEC) recognize the outstanding steps taken by the faculty for the students to learn through problem and activity based teaching in accordance with Washington Accord and International Engineering Alliance's requirements.*

*We deliver engaging and innovative learning and teaching that instills an ethos of curiosity, pragmatism, responsible leadership, and citizenship. Our Outcome Based Education System (OBE) produces graduate engineers who harness the benefits of innovative engineering with sustainable principles in a framework that promotes sustainable economic development, supports enhanced health and well-being, and deliver low-environmental-impact solutions. The Faculty offers an engaging and supportive environment in which undergraduates will work alongside creative and inspirational people keen to share their experiences. We are committed to support talented people to develop partnerships with industry, funding bodies and government agencies, in order to create a paradigm environment where discovery, scholarship, innovation, commercial exploitation and public engagement thrive.*

*Our aim is to be a global leader. The Faculty is destined to achieve this through targeted strategic investment in people, research and teaching. The Faculty is looking for people who share our passion and will enthusiastically help us deliver world class teaching and research to the next generation. We look forward to your joining our vibrant community and hope that you will leave your mark on our world, and are confident that your experience at the Faculty of Engineering will leave its mark on you.*



## Department of Electrical Engineering



**Dr. Ali Nasir**  
HoD

### HoD's Message

Electrical engineering at UCP is more than designing and developing of electrical circuits and systems. We take pride in mentoring individuals into becoming useful members of the society by employing professional ethics, critical thinking, societal and environmental awareness, team work, and lifelong learning. We have world class faculty with more than ten PhD members and more than twenty Master's degree holders who have obtained their post graduate education from renowned institutions all over the world including USA, UK, Germany, Austria, Italy, Thailand and China. Being accredited by Pakistan Engineering Council at Washington Accord level, our ambition is higher than ever before. We thrive to work hard on the professional grooming of our students so that when they graduate, they can find their places in the international job market, multinational companies, and even start something of their own and be the leaders. In this regard, we aid classroom teaching and hands on laboratory work with participation in national and international student competitions, industrial tours, industry-inspired final year projects, and internships.

If you are looking to become a well-rounded professional in the field of electrical engineering, the department of electrical engineering at UCP is the place to be. We look forward to providing you the skills, the knowledge, and most importantly the attitude that you need to excel not just individually but as part of the community, our community, the UCP family.

### Accreditation Status

All batches graduated from the department of Electrical Engineering have been accredited by the Pakistan Engineering Council (PEC). Batches 2014 and 2015 are accredited on level II (Washington Accord).

### Faculty Members

#### Dr. Nazar Hussain Malik

PhD Power Systems Engineering (University Of Windsor, Canada)  
MSc Power Systems Engineering (University Of Windsor, Canada)  
BSc Electrical Engineering (University of Engineering and Technology, Lahore)  
Professor

#### Dr. Ali Nasir

PhD Control Systems (University of Michigan Ann Arbor, USA)  
MSc Control Systems (University of Michigan Ann Arbor, USA)  
BSc Electrical Engineering (University of Engineering and Technology, Taxila)  
Associate Professor/HOD EE

#### Dr. Sarwar Ehsan

PhD Electrical Engineering (Graz University, Austria)  
MSc Electrical Engineering (University of the Punjab, Lahore) BSc Electrical Engineering (University of the Punjab, Lahore)  
Associate Professor



#### Dr. Ali Faisal Murtaza

PhD Power Systems Engineering (Politecnico di Torino, Italy)  
MSc Electrical Engineering (University of Engineering & Technology, Lahore)  
BEng Electrical Engineering (National University of Science and Technology, Islamabad)  
Associate Professor/Director-Research



#### Dr. Muhammad Kamran Saleem

PhD Electrical Engineering (King Saud University, Riyadh-KSA)  
MSc Electrical Engineering (Blekinge Institute of Technology, Karlskrona, Sweden)  
BSc Electrical Engineering (Mirpur University of Science & Technology, Mirpur)  
Associate Professor



#### Dr. Muhammad Rafiq

PhD Applied Mathematics (University of Engineering & Technology, Lahore)  
M.Phil Applied Mathematics (University of Engineering & Technology, Lahore)  
MSc Applied Mathematics (University of Engineering & Technology, Lahore)  
Associate Professor



#### Engr. Muhammad Salman

M.Sc. Electrical Engineering (University of Hull, UK)  
BEng Electrical Engineering (University of Hull, UK)  
Associate Professor



#### Engr. Fesal Toosy

MSc Telecom Engineering (University of Southern California, USA)  
BSc Telecom Engineering (University of Engineering & Technology, Lahore)  
Associate Professor



#### Dr. Kamran Ezdi

PhD Electrical Engineering (Technische Universität Carolo-Wilhelmina Zu Braunschweig, Germany)  
MSc Electrical Engineering (University of London, Kings College, UK)  
BSc Electrical Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor



#### Dr. Muhammad Saadi

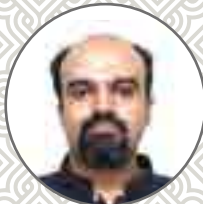
PhD Electrical Engineering (Chulalongkorn University, Thailand)  
MSc Telecommunication Engineering (National University of Malaysia, Malaysia)  
BS Electrical Engineering (FAST, Lahore)  
Assistant Professor

**Engr. Lt. Col. (Rtd) Zulqarnain**

PhD Power Systems Engineering, (University of Central Punjab, Lahore)  
MSc Electrical Engineering (University of Central Punjab, Lahore) BSc Electrical Engineering  
(University of Engineering & Technology, Lahore)  
Assistant Professor

**Engr. Lt. Col. (Rtd) Sikandar Qayyum**

PGC (Hons) Wireless Telecommunication (Humber College, Toronto, Canada)  
MSc Electronics & Communication (University of Engineering & Technology, Lahore)  
BSc Electronics & Communication (University of Engineering & Technology, Lahore)  
Assistant Professor

**Dr. Muhsarraaf Ahmed Hanif**

PhD Embedded System Engineering (University of Leicester, UK)  
MSc Embedded System Engineering (University of Leicester, UK)  
BSc Electronics Engineering (Ghulam Ishaq Khan Institute of Engineering,  
Sciences & Technology, Topi)  
Assistant Professor

**Dr. Majid Gulzar**

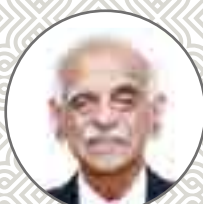
PhD Control Systems Engineering (University of Science & Technology, China)  
MSc Electrical Engineering (University of Engineering & Technology, Lahore)  
BSc Electrical Engineering (University of Central Punjab, Lahore)  
Assistant Professor

**Dr. Arsalan Arif**

PhD Electronics Engineering (Politecnico di Torino, Italy)  
MSc Engineering Management (National University of Science and Technology, Islamabad)  
BSc Electrical Engineering (University of Central Punjab, Lahore)  
Assistant Professor

**Engr. Riaz Ahmad Rana**

MSc Telecommunication Systems (University of Central Punjab, Lahore)  
BSc Electrical Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor

**Engr. Col. (Rtd.) Zia-ul-Islam**

MSc Electrical Engineering (University of Engineering & Technology, Lahore)  
BSc Electrical Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor

**Engr. Kiran Fatima**

MS Electrical Engineering (National University of Computer and Emerging Sciences, Lahore)  
BS Telecommunication Engineering, (National University of Computer and Emerging Sciences,  
Lahore)  
Assistant Professor

**Engr. Nabeel Khalid**

MSc Electrical Engineering (University of Central Punjab, Lahore)  
BSc Electrical Engineering (University of Central Punjab, Lahore)  
Assistant Professor

**Engr. M. Usman Khan**

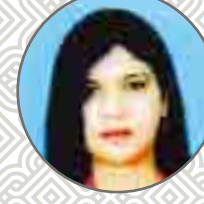
MSc Electrical Engineering University of Engineering & Technology, Lahore)  
BSc Electrical Engineering (University of Central Punjab, Lahore)  
Assistant Professor

**Engr. Areeb Khalid**

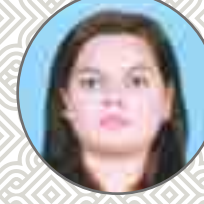
MSc Electrical Engineering (KAU, Sweden)  
BSc Electrical Engineering (University of Central Punjab, Lahore)  
Assistant Professor

**Engr. Arslan Ashraf**

MSc Electrical Engineering (Chalmers University of Technology, Sweden)  
BE Electrical Engineering (National University of Science and Technology, Islamabad)  
Assistant Professor

**Engr. Reda Gilani**

MSc Electrical Engineering (University of Central Punjab, Lahore)  
BSc Electrical Engineering (University of Engineering & Technology, Lahore)

**Engr. Haleema Asif**

MSc Electrical Engineering (University of Central Punjab, Lahore)  
BSc Electrical Engineering (University of Central Punjab, Lahore)  
Assistant Professor



**Ms. Asfar Nisar***M.Phil Mathematics (University of the Punjab, Lahore)**MSc Mathematics (Lahore College for Women University, Lahore)**BSc Mathematics (Lahore College for Women University, Lahore)**Senior Lecturer***Engr. Muhammad Umar***MS Telecommunication Engineering (University of Engineering & Technology, Taxila)**Master in Nuclear Engineering (Quaid-e-Azam University, Islamabad) BSc Electrical Engineering**(University of Engineering & Technology, Lahore)**Lecturer***Engr. Jawad Khalid***MSc Electrical Engineering (University of Central Punjab, Lahore)**BSc Electrical Engineering (University of Central Punjab, Lahore)**Lecturer***Engr. Ali Ahmad***MSc Electrical Engineering (University of Engineering & Technology, Lahore)**BSc Electrical Engineering (University of Central Punjab, Lahore)**Lecturer***Engr. Ali Awais***MSc Computer Engineering (University of Engineering & Technology, Lahore)**BSc Electrical Engineering (University of Central Punjab, Lahore)**Lecturer***Ms. Afifa Sadaqat***M.Phil Physics (University of the Punjab, Lahore)**BSc Physics (University of the Punjab, Lahore)**Lecturer*



## Electrical Engineering Laboratories

The Electrical Engineering Department has well equipped laboratories with state-of-the-art apparatus to support its undergraduate and graduate degree programs and the detail of which is as under:

### Electrical Machines Laboratory

This lab has facilities to perform experiments related to DC machines, Transformers and Induction machines. Three new test benches have been added to this lab and the workstations in the lab have been increased to 10 in number. Tests of every electrical machine, related to the undergraduate coursework, can be performed in this lab.

### Electronics Engineering Laboratory

The Electronics Engineering Laboratory is equipped with the state of the art digital and analog instruments. The lab supports practical work for electronics, integrated electronics and power electronics. Here, the students also learn the use of electronic instruments.

### Telecommunication Laboratory

Telecommunication Engineering Lab has 12 workstations equipped with the latest analog & digital test and measuring instruments, Radar Communication trainers, Electro optic trainers and Telecommunication trainers. Experiments relating to AM & FM Modulation, Demodulation, Digital Optical Communication, Data Communication, etc. can also be performed in this lab.

### Power Engineering Laboratory

A state of the art power engineering lab has recently been established to provide training in the following areas: I) Generation II) Transmission III) Protection and IV) Distribution. ETAP teaching software has been provided to conduct various experiments.

### Microwaves & Communication Systems Engineering Laboratory

The microwave-engineering lab is well equipped to provide an excellent

grounding in basic microwave measurements right from analysis to the design and investigation of complete microwave systems. This lab facilitates students to acquire hands-on hardware design experience and good insight into the structure of microwave integrated circuits (MIC). Recently, this lab has been equipped with latest analog and digital communication trainers (BISKITT).

### Control Engineering Laboratory

Control System Lab is a platform to provide hardware-based practical experience to the students. Since control system is an interdisciplinary course, a rich set of experiments has been developed to help students understand different applications of the course. The lab contains a number of trainers namely ball bearing trainer, magnetic levitation trainer and inverted pendulum trainer. This lab is also equipped with feedback control instruments.

## Bachelor of Science in Electrical Engineering

### Program Educational Objectives (PEOs)

The graduates of the program of B.Sc. Electrical Engineering will be equipped with ethics, skills, and knowledge related to key domains in electrical engineering required to perform and excel in the industry. The objectives of this program are to produce engineers who will demonstrate:

- (i) Work productively as Electrical Engineers exhibiting technical knowledge and problem solving skills in the industry and academia.
- (ii) Analyze and provide engineering solutions with socio-environmental awareness and ethical responsibility.
- (iii) Perform professional duties individually or in a team, following project management procedures with effective communication skills.
- (iv) Avail learning opportunities, keeping abreast with usage of modern tools to maintain and enhance professional growth.

### Program Learning Outcomes (PLOs)

At the time of graduation, the graduates of B.Sc. 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 (F.Sc. Pre-Engineering) or Equivalent with Physics,

Chemistry and Mathematics securing at least 60% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required

OR

diploma of Associate Engineer Examination in relevant discipline securing at least 60% marks in aggregate (up to 2% of maximum allowed seats).

- (ii) UCP Admission Test or HEC approved test.

**Degree Requirements**

Each candidate for the B.Sc. Electrical Engineering degree is required to successfully earn 135/136 Cr. Hrs. with the minimum CGPA of 2.0 on the scale of 4.0 as per the following detail:

**a) Electrical Engineering Foundation Courses (24 Cr. Hrs.)**

Course Title	Code	Cr. Hrs.
Electrical Workshop	EE1411	1
Linear Circuit Analysis	EE1813	3
Linear Circuit Analysis Lab	EE1811	1
Electronic Devices and Circuits	EE2423	3
Electronic Devices and Circuits Lab	EE2421	1
Electrical Network Analysis	EE2823	3
Electrical Network Analysis Lab	EE2821	1
Digital Logic Design	EE2313	3
Digital Logic Design Lab	EE2311	1
Signals and Systems	EE2713	3
Signals and Systems Lab	EE2711	1
Probability Methods for Engineers	EEMT4053	3

**b) Natural Sciences Courses (19 Cr. Hrs.)**

Course Title	Code	Cr. Hrs.
Applied Mathematics I	EEMT1013	3
Applied Physics	EE1113	3
Applied Physics Lab	EE1111	1
Applied Mathematics II	EEMT1023	3
Applied Mathematics III	EEMT2033	3
Multivariable Calculus	EEMT2063	3
Natural Science Elective	EEXX30x3	3

**c) Computing Courses (10 Cr. Hrs.)**

Course Title	Code	Cr. Hrs.
Introduction to Computing	EECS1012	2
Fundamentals of Programming	EECS1023	3
Fundamentals of Programming Lab	EECS1021	1
Data Structures and Algorithms	EECS2033	3
Data Structures and Algorithms Lab	EECS2031	1

**d) Electrical Engineering Core Courses (27 Cr. Hrs.)**

Course Title	Code	Cr. Hrs.
Electrical Machines	EE2833	3
Electrical Machines Lab	EE2831	1
Introduction to Embedded Systems	EE3323	3
Introduction to Embedded Systems Lab	EE3321	1
Electromagnetic Field Theory	EE3523	3
Communication Systems	EE3533	3
Communication Systems Lab	EE3531	1
Linear Control Systems	EE3613	3
Linear Control Systems Lab	EE3611	1
Breadth Core I	EE3xx3	3
Breadth Core I Lab	EE3xx1	1
Breadth Core II	EE3xx3	3
Breadth Core II Lab	EE3xx1	1

**e) Electrical Engineering Elective Courses / Depth Electives (18/19 Cr. Hrs.)**

Course Title	Code	Cr. Hrs.
Depth Elective I	EE3xx3	3
Depth Elective I Lab	EE3xx1	1
Depth Elective II	EE4xx3	3
Depth Elective II Lab	EE4xx1	1
Depth Elective III	EE4xxx	3/4
Depth Elective IV	EE4xx3	3
Depth Elective IV Lab	EE4xx1	1
Depth Elective V	EE4xx3	3

Area	Cr. Hrs.
a) Electrical Engineering Foundation Courses	24
b) Natural Sciences	19
c) Computing Courses	10
d) Electrical Engineering Core Courses	27
e) Electrical Engineering Elective Courses / Depth Courses	18/19
f) Humanities Courses	15
g) Management Sciences	09
h) Inter Departmental Engineering Elective (IDEE)	07
i) Industrial Internship	00
j) Design Project	06
<b>Total</b>	<b>135/136</b>



A B.Sc. (EE) student can take Depth Elective Courses from the following lists:

#### i) Electronics and Telecommunications Engineering

Course Title	Code	Cr. Hrs.
Computer Communications and Networks	EETEx513	3
Computer Communications and Networks Lab	EETEx511	1
Instrumentation and Measurement	EETEx413	3
Instrumentation and Measurement Lab	EETEx411	1
ASIC Design and FPGAs	EETEx313	3
Digital Signal Processing	EETEx713	3
Digital Signal Processing Lab	EETEx711	1
Microcontroller Based Embedded Systems	EETEx323	3
Microcontroller Based Embedded Systems Lab	EETEx321	1
Digital Communications	EETEx523	3
Digital Communications Lab	EETEx521	1
Analog Integrated Electronics	EETEx423	3
VLSI Design	EETEx333	3
Industrial Electronics	EETEx343	3
Digital Electronics	EETEx353	3
Microwave Engineering	EETEx533	3
Microwave Engineering Lab	EETEx531	1
Antenna Theory and Design	EETEx543	3
Wireless Communication	EETEx553	3
Systems Programming	EECSx043	3
Digital Control Systems	EETEx613	3
Numerical Analysis	EEMTx053	3

#### ii) Power Engineering

Course Title	Code	Cr. Hrs.
Power Distribution and Utilization	EEPEx813	3
Power Distribution and Utilization Lab	EEPEx811	1
Power Transmission	EEPEx823	3
Power Generation	EEPEx833	3
Power Electronics	EEPEx413	3
Industrial Electronics	EEPEx423	3
Power System Protection	EEPEx843	3
Power System Protection Lab	EEPEx841	1
Advanced Electrical Machine Design	EEPEx853	3
High Voltage Engineering	EEPEx863	3
Renewable Energy Systems	EEPEx433	3
Industrial Process Engineering	EEPEx623	3
Industrial Process Engineering Lab	EEPEx621	1
Smart Grid	EEPEx873	3
Power Stability and Control	EEPEx883	3

#### iii) Computer Engineering

Course Title	Code	Cr. Hrs.
Digital Image Processing	EECSx713	3
Computer Vision	EECSx723	3
Introduction to Artificial Intelligence	EECSx213	3
Introduction to Artificial Intelligence Lab	EECSx211	1
Introduction to Data Science	EECSx223	3
Introduction to Data Science Lab	EECSx221	1
Operating Systems	EECSx233	3
Machine Learning	EECSx243	3
Internet of Things	EECSx253	3



#### f) Humanities Courses (15 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
English I	EEHU1013	3
Pakistan Studies	EEHU1043	3
Islamic Studies	EEHU1053	3
English II	EEHU2023	3
English III	EEHU3033	3

#### g) Management Sciences (09 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Engineering Economics	EEMG3013	3
Entrepreneurship	EEMG4033	3
Engineering Management	EEMG4043	3

#### h) Inter Departmental Engineering Elective (07 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Engineering Drawing	EEME1021	1
Basic Mechanical Engineering	EEME1033	3
Thermodynamics	EEME2043	3

#### i) 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.

#### j) Design Project (06 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 I	EE4912	2
Design Project II	EE4924	4

#### Community Work (EE3000)

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

#### Program Duration

This is a four-year degree program comprising of 8 semesters. There will be a Fall and a Spring semester in each year. The summer semester will be utilized for internship or deficiency courses. The maximum duration to complete B.Sc. Electrical Engineering degree is 7 years.



**Scheme of Studies B.Sc. in Electrical Engineering****Semester-I (16 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EECS1012	Introduction to Computing	Computing	2
EE1411	Electrical Workshop	EE Foundation	1
EEMT1013	Applied Mathematics I	Natural Sciences	3
EE1113	Applied Physics	Natural Sciences	3
EE1111	Applied Physics Lab	Natural Sciences	1
EEHU1013	English I	Humanities	3
EEHU1043	Pakistan Studies	Humanities	3

**Semester-II (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EE1813	Linear Circuit Analysis	EE Foundation	3
EE1811	Linear Circuit Analysis Lab	EE Foundation	1
EEME1021	Engineering Drawing	IDEE	1
EEME1033	Basic Mechanical Engineering	IDEE	3
EEMT1023	Applied Mathematics II	Natural Sciences	3
EEHU1053	Islamic Studies	Humanities	3
EECS1023	Fundamentals of Programing	Computing	3
EECS1021	Fundamentals of Programing Lab	Computing	1

**Semester-III (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EECS2033	Data Structures and Algorithms	Computing	3
EECS2031	Data Structures and Algorithms Lab	Computing	1
EE2423	Electronic Devices and Circuits	EE Foundation	3
EE2421	Electronic Devices and Circuits Lab	EE Foundation	1
EE2823	Electrical Network Analysis	EE Foundation	3
EE2821	Electrical Network Analysis Lab	EE Foundation	1
EEME2043	Thermodynamics	IDEE	3
EEMT2033	Applied Mathematics III	Natural Sciences	3

**Semester-IV (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EE2313	Digital Logic Design	EE Foundation	3
EE2311	Digital Logic Design Lab	EE Foundation	1
EE2713	Signals and Systems	EE Foundation	3
EE2711	Signals and Systems Lab	EE Foundation	1
EE2833	Electrical Machines	EE Core	3
EE2831	Electrical Machines Lab	EE Core	1
EEMT2063	Multivariable Calculus	Natural Sciences	3
EEHU2023	English II	Humanities	3

**Scheme of Studies B.Sc. in Electrical Engineering****Semester-V (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EE3323	Introduction to Embedded Systems	EE Core	3
EE3331	Introduction to Embedded Systems Lab	EE Core	1
EE3523	Electromagnetic Field Theory	EE Core	3
EEXX3xx3	Breadth Core I	EE Core	3
EEXX3xx1	Breadth Core I Lab	EE Core	1
EE3533	Communication Systems	EE Core	3
EE3531	Communication Systems Lab	EE Core	1
EEXX30x3	Natural Science Elective*	Natural Sciences	3

\*Multivariable Calculus (EEMT3073)/ Discrete Mathematics (EEMT3083)/ Numerical Analysis (EEMT3093)/ Biology (EEBI3013)

**Semester-VI (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EEXX3xx3	Breadth Core II	EE Core	3
EEXX3xx1	Breadth Core II Lab	EE Core	1
EEXX3xx3	Depth Elective I	EE Elective	3
EEXX3xx1	Depth Elective I Lab	EE Elective	1
EE3613	Linear Control Systems	EE Core	3
EE3611	Linear Control Systems Lab	EE Core	1
EEMG3013	Engineering Economics	Management	3
EEHU3033	English III	Humanities	3

**Semester-VII (15/16 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EEXX4xx3	Depth Elective II	EE Elective	3
EEXX4xx1	Depth Elective II Lab	EE Elective	1
EEXX4xxx	Depth Elective III	EE Elective	3/4
EEMG4033	Entrepreneurship	Management	3
EEMT4053	Probability for Engineers	EE Foundation	3
EE4912	Design Project I	Design Project	2

**Semester-VIII (14 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
EEXX4xx3	Depth Elective IV	EE Elective	3
EEXX4xx1	Depth Elective IV Lab	EE Elective	1
EEXX4xx3	Depth Elective V	EE Elective	3
EEMG4043	Engineering Management	Management	3
EED4924	Design Project II	Design Project	4



# Master of Science in Electrical Engineering

## Admission Requirements

- (i) A minimum of 16 years of education leading to BS / BE / B.Sc. in Electrical / Electronics / Telecommunications Engineering or equivalent
- (ii) Minimum 2.00/4.00 CGPA or 50% marks in annual system
- (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)

Each candidate for the M.Sc. Electrical Engineering degree is required to successfully earn 30 Cr. Hrs. as per the following detail:

	Area	Cr. Hrs.
a)	Core Courses	06
b)	Specialization Courses	15
c)	Elective	03
d)	Thesis/Project/Additional Courses	06
	<b>Total</b>	<b>30</b>

### a) Core Courses

Course Title	Code	Cr. Hrs.
Linear System Theory	EE5613	3
Advanced Probability	EE5513	3

### b) Specialization Courses

#### i) Power and Control

Course Title	Code	Cr. Hrs.
Power Systems Analysis	EE5813	3
Advanced Power Systems	EE5823	3
Switch Mode Power Supplies	EE5833	3
Photovoltaic Based Energy Systems	EE5843	3
High Voltage Equipment	EE5853	3
High Voltage Engineering	EE5863	3
Distributed Control of Multiagent Systems	EE5623	3
Nonlinear Control Systems	EE5633	3



#### ii) Electronics and Telecommunication

Course Title	Code	Cr. Hrs.
Advanced Antenna Design	EE5523	3
Advanced Microwave Engineering	EE5533	3
Graph Theory	EE5213	3
Satellite Communication	EE5543	3
Advanced Computer Architecture	EE5313	3

#### c) Elective Courses

A student may choose 3 to 9 Cr. Hrs., depending upon the degree completion option, from the given list or any other course offered by the EE department.

Course Title	Code	Cr. Hrs.
Stochastic Processes	EE5713	3
Advanced Digital Communications	EE5553	3
Cellular and Mobile Communications	EE5563	3
Analog Integrated Electronic Circuits	EE5413	3
Advanced ASIC Design and FPGA	EE5323	3
Advanced Power Electronics	EE5423	3
Renewable Energy Systems	EE5873	3
Smart Grid	EE5883	3

#### d) Research Thesis

Course Title	Code	Cr. Hrs.
Research Thesis	EE6916	6
Thesis Continuation	EE6921	1

### 6.3 CGPA Requirement

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements.

### 6.4 Program Duration

This is nominally a two-year degree program comprising of 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete MS Electrical Engineering degree is 04 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) M.Sc. degree in relevant discipline
- (ii) Minimum CGPA 3.00/4.00 (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) Synopsis Defense
- (iv) 30 Cr. Hrs. Research Work
- (v) Publication of at least one research paper in HEC approved journal
- (vi) Dissertation Foreign Reviews
- (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	4 Semesters
Synopsis Qualification	4 Semesters	6 Semesters
Thesis Submission	6 Semesters	14 Semesters (7 Years)





## Department Mechanical Engineering



**Dr. Rizwan Shad**  
HoD

### HoD's Message

The field of Mechanical Engineering has become more interesting and challenging in the modern era in line with the latest industrial revolutions. The Department of Mechanical Engineering at UCP presents one of the best combination of foreign qualified, experienced and young faculty, equipped with modern state of the art labs and follows best practices of engineering education as per PEC and Washington Accord guidelines. The department is motivated to prepare its graduates having up to date engineering knowledge, attitudes and skills that will enable them to become acceptable in the global job markets as well as become successful entrepreneurs of the future. Our curriculum is a blend of classical and modern challenges of the discipline having a diversity of areas including computer-aided design, analysis & manufacturing, thermal, engineering management and interdisciplinary courses like Business & Entrepreneurship, Instrumentation & Control and industrial electronics. Through our strong industrial linkages, we involve our students to solve complex engineering problems of the industry and also provide them ample opportunities to take part in industrial visits and trainings. I welcome you all to become a part of our vibrant teaching-learning environment and research activities.

### Accreditation Status

All batches graduated from the department of Mechanical Engineering have been accredited by the Pakistan Engineering Council (PEC). Batches 2014 and 2015 are ac- credited on level II (Washington Accord).

### Faculty Members

#### Engr. Mumtaz Ul Hasan Zuberi

MSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
BSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
Professor

#### Dr. Faiz Ul Hasan

PhD Material Engineering (University of Manchester, UK)  
MSc Material Engineering University of Sheffield, UK)  
BSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
Professor

#### Dr. Rizwan Shad

PhD Applied Mechanics (INSA Toulouse, France)  
MSc Mechanical Engineering (INSA Toulouse, France)  
BSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
Associate Professor/HOD ME



#### Dr. Gulraiz Ahmed

PhD Mechanical Engineering (University of Canterbury, New Zealand)  
MSc Aerodynamics & Computation (University of Southampton, UK)  
BSc Aerospace Engineering (Institute of Space Technology, Islamabad)  
Assistant Professor



#### Dr. Zohaib Aftab

PhD, Mechanical Engineering (University Claude Bernard Lyon 1, France)  
MSc Automation & Robotics (Ecole Centrale de Nantes, Nantes, France)  
BSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor



#### Dr. Muhammad Kashif

PhD Engineering Sciences (University Pierre and Marie Curie, Paris, France)  
MS Engineering Sciences (University Pierre and Marie Curie, Paris, France)  
BSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor



#### Engr. Taimur Iqbal Qureshi

MS Mechanical Engineering (National University of Science & Technology, Islamabad)  
BSc Mechanical Engineering (Govt. Degree College, Jhelum)  
Assistant Professor



#### Engr. Sadaf Zeeshan

MSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
BSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor



#### Engr. Ahmad Mahmood

MSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
BSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor



#### Engr. Baber Saeed

MSc Mechanical Engineering (University of Birmingham, UK)  
BSc Mechanical Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor



**Mr. Waheed Ahmed***MA English (University of Sindh, Hyderabad)**Executive Course on Communication Skills (Asia Pacific Centre for Security Studies, Hawaii, USA)**Assistant Professor***Engr. Muhammad Nouman Liaqat***MSc Mechanical Engineering (Ghulam Ishaq Khan Institute of Engineering, Sciences & Technology, Topi)**BSc Mechanical Engineering (University of Engineering & Technology, Taxila)**Lecturer***Engr. Hurair Tariq***MSc Mechanical Engineering (University of London, UK) ME Mechanical Engineering (NED University, Karachi) BE Mechanical Engineering (NED University, Karachi)**Lecturer***Engr. Umair Naseem***MSc Mechanical Engineering (Brandenburg University of Technology, Germany)**BSc Mechanical Engineering (University of Engineering & Technology, Lahore)**Lecturer***Engr. Qasim Shafqat***MSc Mechanical Engineering (University of Engineering & Technology, Lahore)**BSc Mechanical Engineering (University of Engineering & Technology, Lahore)**Lecturer***Engr. Marium Shahid***MSc Mechanical Engineering (University of Engineering & Technology, Lahore)**BSc Mechanical Engineering (University of Engineering & Technology, Lahore)**Lecturer***Engr. Khizer Ahmed Zaki***MSc Engineering Management (National University of Science & Technology, Islamabad)**BSc Mechanical Engineering (University of Engineering & Technology, Lahore)**Lecturer***Engr. Umer Hayat***MSc Mechanical Engineering (King Fahad University of Petroleum & Minerals, KSA)**BSc Mechanical Engineering (University of Engineering & Technology, Peshawar)**Lecturer*



## Mechanical Engineering Laboratories

### Thermodynamics Lab

The main objective of this fundamental lab is to enable students to gain practical knowledge and skills related to the field of thermal power plants, turbo-machines and energy. The lab is fully equipped to help students to learn the fundamentals and working principles of various instruments, and verify the laws of thermodynamics. The laboratory offers various state of the art test beds with latest instruments to understand the operation and performance parameters of thermal equipment like, multi-stage compressor test bed, engine test bed, steam turbine power plant, combustion laboratory unit, and cut models of single and multi-cylinder engines.

### Refrigeration & Air Conditioning (RAC) Lab

The RAC lab is equipped to demonstrate the basic principles of heat transfer and working of heat exchangers and RAC equipment. The laboratory offers apparatus for measuring the fundamental processes like heat conduction, convection and radiation and different thermal properties like thermal conductivity, emissivity etc. The refrigeration equipment like heat pump, vapour compression and vapour absorption help the students to understand and measure the performance of refrigeration equipment. The laboratory also houses apparatus for the demonstration and analysis of the central air conditioning systems. HVAC laboratory has up to date apparatus with state-of-the-art instrumentation.

### Mechanical Workshop

Mechanical Engineering Department fully endorses the importance of mechanical workshop for students.

A well-equipped workshop, with highly trained staff, provides hands on training on bench working, machining, welding, casting, wood working, and electrical machines. Strict rules are applied for workshop practices to make the students conscious about safety. Students can work independently on computer-aided manufacturing. Imparted workshop training adequately prepare students to conduct their term research projects and fabricate their final year project hardware.

### Fluid Mechanics Lab

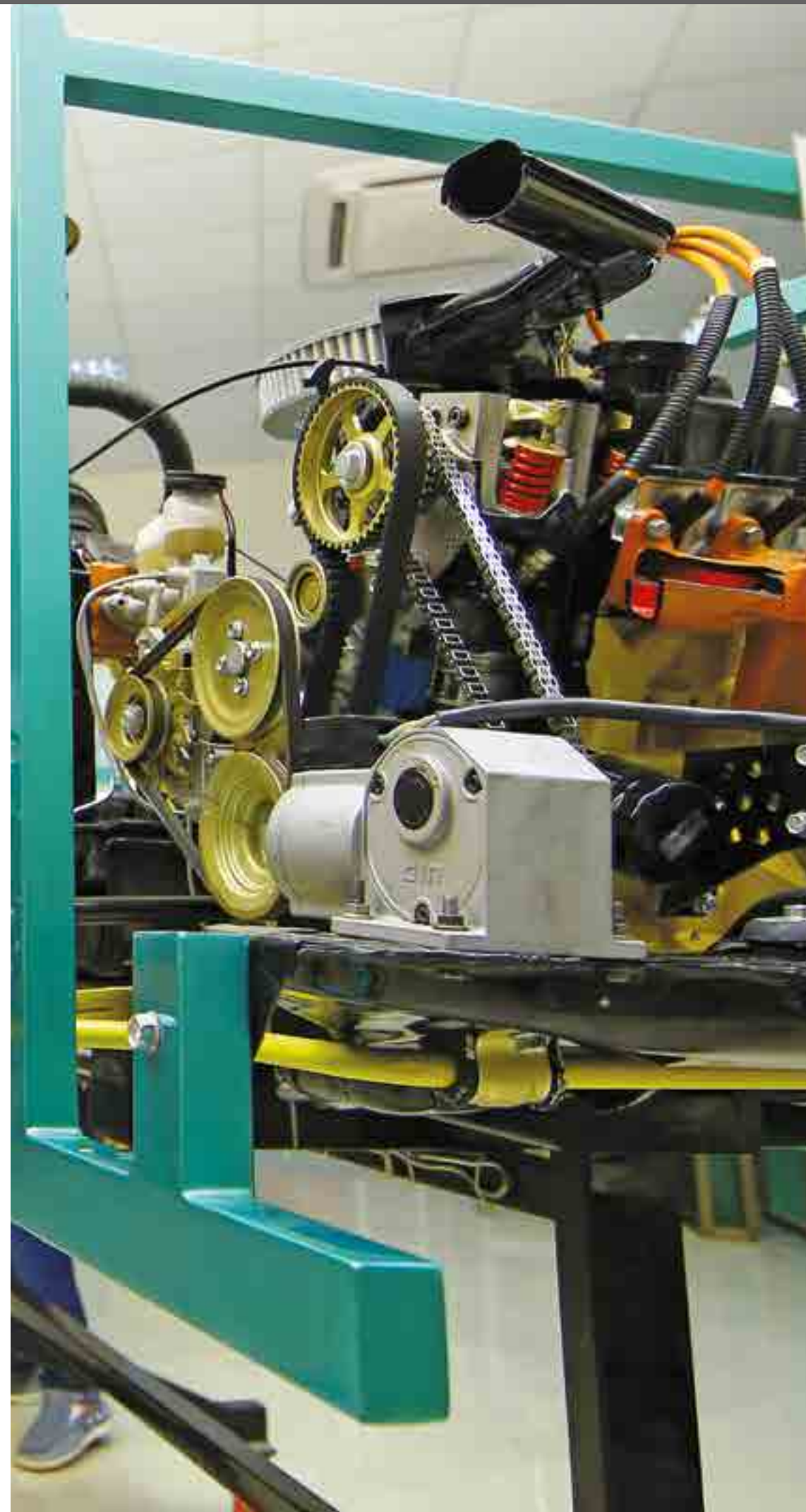
Fluid mechanics laboratory is necessary to build the foundation of engineering students requiring them to master more advanced concepts, processes and equipment. Keeping this in view, fluid mechanics lab offers access to an extensive array of apparatus and equipment experiments. The apparatus housed in fluid mechanics include equipment to verify Bernoulli's theorem, Osborne Reynold's Flow for demonstration of effect of flow speed on turbulence, Jet flow principle, Pipe Friction laws, etc. The advanced equipment is present in order to understand the working and measuring the performance parameters of Impulse and Reaction Turbines, Centrifugal Pumps, and Fluid Friction Apparatus.

### Engineering Statics and Dynamics Lab

Engineering statics and dynamics principles are life time learning for mechanical engineers. This Lab has the latest apparatus to verify the principles and covers experiments to authenticate the theoretical knowledge taught in the subjects of Statics and Dynamics.

### Mechanics of Materials Lab

The Lab is sufficiently equipped with the latest apparatus to conduct



experiments related to mechanical properties and carry out experimental stress analysis. Students get the opportunity to visualize stresses and practically deal with stresses including normal, torsional and flexural stresses, creep, impact loading, fatigue and hardness. Students also analyze structures using strain gauges to verify their computer aided analysis problems.

### Mechanics of Machines Lab

The Lab is designed to verify fundamentals of mechanics of machines and mechanisms. Students understand elements related to the basics of machine including gears, bearings, cams, screws, flywheel, governors, and variety of mechanisms. Students are required to design a mechanism of practical nature and prove its dynamics.

### Computer Aided Design (CAD) Lab

This Lab is established to train students in computer aided design (CAD), computer aided manufacturing (CAM) and computer aided analysis (CAA). The Lab is equipped with core i7 desktops and licensed CAD/CAM/CAA software. Students not only attain skills to work on software like ANSYS, Pro E, and Solid Edge but also utilize the lab to model their final year projects.

### Metrology Lab

Metrology Lab is designed with the objective to enable students to explain principles and issues related to measurement and use of modern and conventional measurement tools precisely for solving problems for quality improvement. It also enables the mechanical engineering graduates to analyze process variations and propose solutions for production quality and satisfy the customer needs in

product and service sector organization. 28 apparatus are available consisting of various gauges for the purpose.

### UCP Bio Mechatronics Lab

The Bio Mechatronics lab at UCP focuses on the development of robotic devices to help people with limb disabilities. The goal is to make modern assistive devices, such as exoskeletons, accessible to disabled people living in countries with severe financial constraints like Pakistan. By taking an integrated approach that combines the knowledge of engineering, biomechanics and the power of inexpensive electronics, we can greatly enhance the performance of existing low-tech assistive devices in use. A major focus area is the walking disabilities which affect around 1 million people in Pakistan. Several exoskeleton prototypes have been developed and tested for polio and spinal cord injuries patients.

The Lab has maintained close collaboration with the local medical industry for an accelerated path to product development. Recently, the Lab has been selected as one of the partner labs of National Centre of Robotics and Automation (NCRA) established by Government of Pakistan and has secured several research findings from various organizations.

### Drawing Hall

A spacious drawing hall is available, equipped with standard drawing tables, to build engineering drawing skills of the students. The concept of transforming a 3D model to 2D drawings is developed. Physical models of various machine elements are demonstrated to the students for better understanding.



# Bachelor of Science in Mechanical Engineering

## Program Educational Objectives (PEOs)

The graduates of B.Sc. Mechanical Engineering will demonstrate knowledge of key technologies applicable in the main areas of Mechanical Engineering. The main objectives of this program are to produce engineers 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 B.Sc. 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 (F.Sc. Pre-Engineering) or Equivalent with Physics, Chemistry and Mathematics securing at least 60% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required

OR

diploma of Associate Engineer Examination in relevant discipline securing at least 60% marks in aggregate (up to 2% of maximum allowed seats).

- (ii) UCP Admission Test or HEC approved test.

## Degree Requirements

Each candidate for the B.Sc. Mechanical Engineering degree is required to complete successfully 135 Cr. Hrs. with the minimum CGPA of 2.0 on the scale of 4.0 as per the following detail:

Area	Cr. Hrs.
a) Mechanical Engineering Foundation Courses	25
b) Mechanical Engineering Breadth Courses	39
c) Mechanical Engineering Depth Courses	07
d) Natural Sciences	15
e) Computing Courses	02
f) Inter Departmental Engineering Electives (IDEE)	10
g) Humanities Courses	17
h) Management Sciences	08
i) Mechanical Engineering Elective Courses	06
j) Industrial Internship	00
k) Design Project	06
<b>Total</b>	<b>135</b>

## a) Mechanical Engineering Foundation Courses (25 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Engineering Drawing, Auto CAD & Graphics	ME1212	2
Engineering Mechanics-I	ME1513	3
Workshop Technology	ME1312	2
Mechanics of Machines-I	ME2223	3
Fluid Mechanics-I	ME2713	3
Mechanics of Materials-I	ME2523	3
Applied Thermodynamics-I	ME1413	3
Engineering Materials	ME1613	3
Manufacturing Processes-I	ME2813	3

## b) Mechanical Engineering Breadth Courses (39 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Engineering Mechanics-II	ME2533	3
Engineering Mechanics-II Lab	ME2331	1
Mechanics of Machines-II	ME2233	3
Mechanics of Machines-II Lab	ME2231	1
Machine Design-I	ME2243	3

Mechanics of Materials-II	ME2543	3
Mechanics of Materials-II Lab	ME2541	1
Machine Design-II	ME3253	3
Machine Design-II Lab	ME3251	1
Finite Element Analysis	ME3263	3
Finite Element Analysis Lab	ME3261	1
Manufacturing Processes-II	ME3823	3
Manufacturing Processes-II Lab	ME3821	1
Applied Thermodynamics-II	ME2423	3
Applied Thermodynamics-II Lab	ME2421	1
Fluid Mechanics-II	ME3723	3
Fluid Mechanics-II Lab	ME3721	1
Heat & Mass Transfer	ME3433	3
Heat & Mass Transfer Lab	ME3431	1

## c) Mechanical Engineering Depth Courses (07 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
IC Engines	ME3443	3
IC Engines Lab	ME3441	1
Power Plants	ME3453	3

## d) Natural Sciences Courses (15 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Applied Mathematics I	MENT1013	3
Applied Physics	ME1113	3
Applied Mathematics II	MENT1023	3
Applied Mathematics III	MENT2043	3
Numerical Analysis	MENT3053	3

## e) Computing Courses (02 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Computer System and Programming	MECS1012	2



### f) Inter Departmental Engineering Electives (10 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Basic Electrical Engineering	MEEE1012	2
Basic Electrical Engineering Lab	MEEE1011	1
Industrial Electronics	MEEE3022	2
Industrial Electronics Lab	MEEE3021	1
Instrumentation & Control	MEEE4033	3
Instrumentation & Control Lab	MEEE4031	1

### g) Humanities Courses (17 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
English I	MEHU1013	3
English II	MEHU1023	3
Islamic Studies	MEHU1053	3
Pakistan Studies	MEHU1043	3
English III	MEHU3033	3
Health, Safety & Environment	MEHU4042	2

### h) Management Sciences (08 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Industrial Management & Economics	MEMG4012	2
Entrepreneurship	MEMG4023	3
Metrology and Quality Assurance	MEMG4072	2
Metrology and Quality Assurance Lab	MEMG4071	1
Operational Management	MEMG4033	3
Total Quality Control	MEMG4043	3
Operation Research	MEMG4053	3
Engineering Law	MEMG4063	3

### i) Elective Courses (06 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Refrigeration & Air Conditioning	ME3462	2
Refrigeration & Air Conditioning Lab	ME3461	1
Renewable Energy Technology	ME3473	3
Gas Dynamics	ME3733	3
Aerodynamics	ME3743	3
Mechanical Vibrations	ME4552	2
Mechanical Vibrations Lab	ME4551	1
Maintenance Engineering	ME4xx3	3
Introduction to Mechatronics	ME4623	3
Automation and Robotics	ME4633	3
Computational Fluid Dynamics	ME4753	3

### j) Industrial Internship (ME4000)

All students shall be required to undergo accumulated industrial internship of 6 weeks in the 3rd/4th years of studies.

### k) Design Project (06 Cr. Hrs.)

After completing 6 semesters of studies, the student will demonstrate their practical skills in the field of mechanical engineering by undertaking a Final Year Project (FYP). The project stands 6 credit hours and will be completed in 4th year, i.e. 7th and 8th semesters.

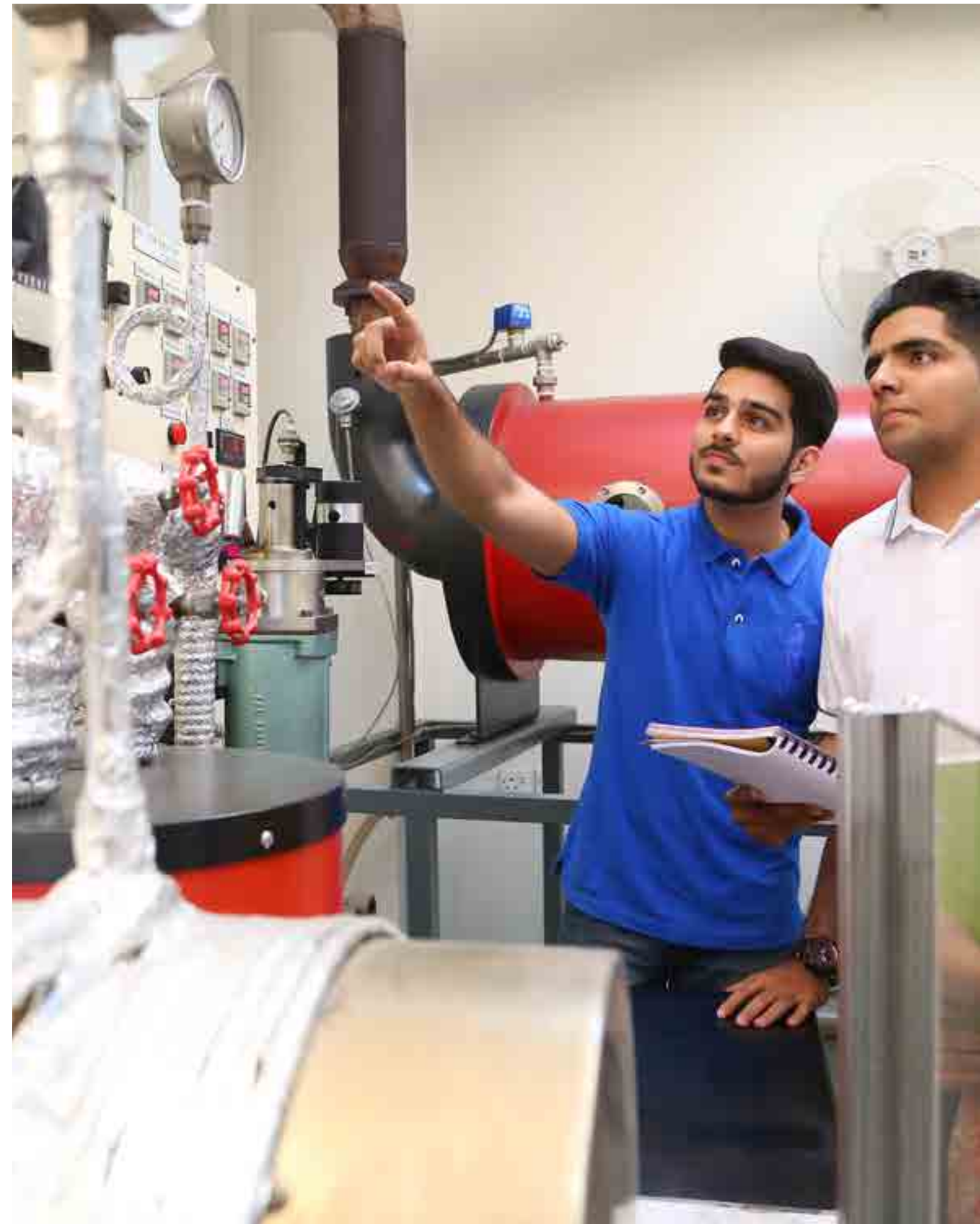
Course Title	Code	Cr. Hrs.
Final Year Project-I	ME4912	2
Final Year Project-II	ME4924	4

### 4.5 Community Work (ME3000)

All students shall be compulsorily rendering 65 hours of voluntary social work during course of studies, which is pre-requisite for award of degree.

### 4.6 Program Duration

The program is 4-year bachelor with two semesters per academic year. Fall Semester shall be usually commencing in September/October each year whereas Spring Semester shall be starting in February/March.





**Scheme of Studies B.Sc. in Mechanical Engineering****Semester-I (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MEHU1013	English I	Humanities	3
MENT1013	Applied Mathematics I	Natural Sciences	3
ME1113	Applied Physics	Natural Sciences	3
MEHU1053	Islamic Studies	Humanities	3
MECS1012	Computer System and Programming	Computing	2
ME1212	Engineering Drawing, Auto CAD & Graphics	Foundation	2
ME1312	Workshop Technology	Foundation	2

**Semester-II (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
ME1413	Applied Thermodynamics-I	Foundation	3
MENT1023	Applied Mathematics II	Natural Sciences	3
MEEE1012	Basic Electrical Engineering	IDEE	2
MEEE1011	Basic Electrical Engineering Lab	IDEE	1
ME1613	Engineering Materials	Foundation	3
ME1513	Engineering Mechanics-I	Foundation	3
MEHU1023	English II	Humanities	3

**Semester-III (17 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
ME2223	Mechanics of Machines-I	Foundation	3
ME2813	Manufacturing Processes-I	Foundation	3
ME2423	Applied Thermodynamics-II	Breadth	3
ME2421	Applied Thermodynamics-II Lab	Breadth	1
ME2523	Mechanics of Materials-I	Foundation	3
ME2533	Engineering Mechanics-II	Breadth	3
ME2531	Engineering Mechanics-II Lab	Breadth	1

**Semester-IV (17 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MENT2043	Applied Mathematics III	Natural Sciences	3
ME2233	Mechanics of Machines-II	Breadth	3
ME2231	Mechanics of Machines-II Lab	Breadth	1
ME2713	Fluid Mechanics-I	Foundation	3
ME2243	Machine Design-I	Breadth	3
ME2543	Mechanics of Materials-II	Breadth	3
ME2541	Mechanics of Materials-II Lab	Breadth	1

**Scheme of Studies B.Sc. in Mechanical Engineering****Semester-V (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MEHU3033	English III	Humanities	3
ME3253	Machine Design-II	Breadth	3
ME3251	Machine Design-II Lab	Breadth	1
ME3723	Fluid Mechanics-II	Breadth	3
ME3721	Fluid Mechanics-II Lab	Breadth	1
ME3823	Manufacturing Processes-II	Breadth	3
ME3821	Manufacturing Processes-II Lab	Breadth	1
MENT3053	Numerical Analysis	Natural Sciences	3

**Semester-VI (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MEHU3043	Pakistan Studies	Humanities	3
ME3263	Finite Element Analysis	Breadth	3
ME3261	Finite Element Analysis Lab	Breadth	1
ME3433	Heat & Mass Transfer	Breadth	3
ME3431	Heat & Mass Transfer Lab	Breadth	1
MEEE3022	Industrial Electronics	IDEE	2
MEEE3021	Industrial Electronics Lab	IDEE	1
ME3443	IC Engines	Depth	3
ME3441	IC Engines Lab	Depth	1

**Semester-VII (16 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MEMG4012	Industrial Management and Economics	Management	2
MEEE4033	Instrumentation & Control	IDEE	3
MEEE4031	Instrumentation & Control Lab	IDEE	1
MEMG4023	Entrepreneurship	Management	3
ME4552	Mechanical Vibrations	Elective	2
ME4551	Mechanical Vibrations Lab	Elective	1
MEHU4042	Health, Safety & Environment	Humanities	2
ME4912	Final Year Project	Design Project	2

**Semester-VIII (13 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
MEMG4072	Metrology & Quality Assurance	Manage	2
MEMG4071	Metrology & Quality Assurance Lab	Management	1
ME4462	Refrigeration & Air Conditioning	Depth	2
ME4461	Refrigeration & Air Conditioning Lab	Depth	1
ME4453	Power Plants	Depth	3
ME4924	Final Year Project	Design Project	4



# Master of Science in Mechanical Engineering

## Admission Requirements

- (i) A minimum of 16 years of education leading to BS / BE / B.Sc. in Mechanical 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 M.Sc. Mechanical Engineering 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)

Area	Cr. Hrs.
a) Core Courses	06
b) Specialization Courses	15
c) Elective	03
d) Thesis/Project/Additional Courses	06
<b>Total</b>	<b>30</b>

### a) Core Courses

Course Title	Code	Cr. Hrs.
Research Methodology	ME5013	3
Modeling and Simulation	ME6023	3

### b) Specialization Courses

#### i) Design and Manufacturing

Course Title	Code	Cr. Hrs.
Advanced Manufacturing Processes	ME5813	3
Mechanics of Fracture and Fatigue	ME5213	3
Advanced Mechanical Vibrations	ME6223	3
Welding and Joining Processes	ME6233	3
Robotics and Control	ME6823	3
Advanced Stress Analysis	ME6243	3

#### ii) Thermal

Course Title	Code	Cr. Hrs.
Automotive Power Trains	ME5413	3
Advanced Thermodynamics	ME5423	3
CFD for Engineering Applications	ME6713	3
Renewable Energy Systems	ME6433	3
Aerodynamics	ME6723	3
Gas Dynamics	ME6733	3

### c) Elective Courses

A student may choose 3 to 9 Cr. Hrs., depending upon the degree completion option, from the given list or any other course offered by the ME department.

Course Title	Code	Cr. Hrs.
Theory of Plates and Shells	ME6253	3
Design of Machine Tools	ME6263	3
Engineering Plasticity	ME6273	3
Mechanics of Composite Materials	ME6283	3
Solar Energy Utilization	ME6443	3
Energy Management	ME6453	3
Advanced Propulsion	ME6463	3
Energy Systems	ME6473	3
Advanced Heat and Mass Transfer	ME6513	3
Boiling and Condensation Heat Transfer	ME6523	3
Industrial Air Conditioning and Refrigeration	ME6533	3
Design of Industrial Boilers and Furnaces	ME6543	3
Fuel Cell Technology	ME6553	3
Turbulent Flow	ME6743	3
Boundary Layer Theory	ME6753	3
Two Phase Flow	ME6763	3

Theory of Granular Flows	ME6573	3
Gradient Optimization Techniques	ME6833	3
Nano Fabrication and Manufacturing	ME6843	3
Quality Engineering and Management	ME6853	3
Product Life Cycle Management	ME6863	3
Productivity Engineering	ME6873	3
Experimental Methods	ME5313	3
Scheduling and Sequencing	ME6883	3
Theory of Metal Cutting	ME6893	3

### d) Research Thesis

Course Title	Code	Cr. Hrs.
Research Thesis	ME6916	6
Thesis Continuation	ME6921	1

## CGPA Requirement

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements.

## Program Duration

This is nominally a two-year degree program comprising of 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete MS Mechanical Engineering degree is 04 years.







## Department of Civil Engineering



**Dr. Kafeel Ahmed**  
HoD

### HoD's Message

The Department of Civil Engineering is striving hard to impart highest level of excellence in teaching and research. The department has a galaxy of highly experienced Professors and talented young instructors, who leave no stone unturned in delivering state-of-the-art knowledge of Civil Engineering to students, so that they can make their mark in professional excellence and research. The accreditation of B.Sc Civil Engineering Program of UCP at level II by Pakistan Engineering Council is an evidence of our teaching expertise and skills. The advance laboratories of the department, equipped with latest machine and instruments, offer an opportunity to the students to practice hands on skills and improve their professional competence. The Masters pro- gram has set the pace for research and higher standard of education at post graduate level. The significant research output of PhD faculty is an evidence of our progress in this arena. The faculty, students and staff all are committed to transform Civil Engineering Department, one of the best departments at national and international level.

### Accreditation Status

All batches graduated from the department of Civil Engineering have been accredited by the Pakistan Engineering Council (PEC). Batches 2015 and 2016 are accredited on level II (Washington Accord).

### Faculty Members



#### **Dr. Muhammad Akram Tahir**

PhD Structural Engineering & Mechanics (Asian Institute of Technology, Bangkok)  
MEng Structural Engineering & Mechanics (Asian Institute of Technology, Bangkok)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Professor / Dean-Faculty of Engineering



#### **Prof. Faiz Ahmad Chishti**

MSc Hydraulic Engineering (Asian Institute of Technology, Bangkok)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Professor



#### **Dr. Javed Anwar Aziz**

PhD Civil Engineering (University of Birmingham, UK)  
MSc Environmental Engineering, (University of Engineering & Technology, Lahore)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Professor



#### **Dr. Kafeel Ahmed**

PhD Structural Engineering (University of Engineering & Technology, Lahore)  
MSc Civil Engineering (University of Engineering & Technology, Lahore)  
BSc Civil Engineering, (University of Engineering & Technology, Lahore)  
Professor



**Prof. Dr. Syed M. Saeed Shah**

PhD Engineering Hydrology (University of Newcastle, UK)  
BSc Agriculture Engineering (University of Agriculture, Faisalabad)  
Professor

**Dr. Muhammad Babur**

PhD Water Engineering & Management (Asian Institute of Technology, Bangkok)  
MSc Civil Engineering (Mississippi State University, USA)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor

**Dr. Muhammad Awais Shafique**

PhD Civil Engineering (TOKYO University, Japan)  
MSc Engineering (University of Engineering & Technology, Lahore)  
BSc Civil Engineering (University of Engineering and Technology, Lahore)  
Assistant Professor

**Dr. Khawaja Bilal Ahmed**

PhD Water Resources Engineering (University of Nantes, France)  
MSc Water Resources Engineering (University of De Caen, France)  
BSc Civil Engineering (University of Engineering & Technology, Peshawar)  
Assistant Professor

**Engr. Mirza Imran Ahmad Khan**

MSc Structural Engineering (University of Engineering & Technology, Lahore)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor

**Engr. Muhammad Arshad**

M. Arch. (University of Engineering & Technology, Lahore)  
MSc Structural Engineering (Michigan State University, USA)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor

**Engr. Javed Rasul**

BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Assistant Professor

**Engr. Aiman Jamshaid**

MSc Hydraulics Engineering (University of Stuttgart, Germany)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Lecturer

**Engr. Muhammad Ahmad**

MSc Structural Engineering (University of Engineering & Technology, Lahore)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Lecturer

**Engr. Burhan Ahmad**

MSc Structural Engineer (University of Engineering and Technology, Lahore)  
BSc Civil Engineering (University of Engineering and Technology, Lahore)  
Lecturer

**Engr. Hannan Saif**

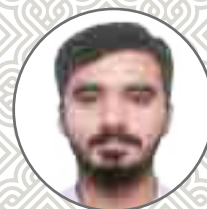
MSc Hydraulics & Irrigation Engineering (University of Engineering & Technology, Lahore)  
BSc Civil Engineering (Bahauddin Zakariya University, Lahore)  
Lecturer

**Engr. Tanveer Younus**

MSc Structural Engineering (University of Engineering & Technology, Lahore)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Lecturer

**Engr. Javairia Mumtaz**

MSc Geotechnical Engineering (University of Engineering & Technology, Lahore)  
BSc Civil Engineering (University of Engineering & Technology, Lahore)  
Lecturer

**Engr. Attiq Ur Rahman Dogar**

MSc Civil Engineering (Czech Technical University, Prague, Czech Republic)  
BSc Civil Engineering (National University of Science & Technology, Islamabad)  
Lecturer



## Civil Engineering Laboratories

The Department of Civil Engineering has following laboratories equipped with latest equipment to provide adequate experimentation and testing facilities to the students of B.Sc. and M.Sc. Civil Engineering Programs.

### Engineering Materials Laboratory

Engineering Materials Laboratory deals with the practical aspects of testing the construction materials like concrete, steel, wood, masonry and assessment of their mechanical properties. This laboratory also provides hands-on experience with the facilities for testing aggregate, cement, admixtures and wood. This laboratory is equipped with latest equipment, including universal testing machine, compaction testing machine, Charpy impact test/machine, Rockwell hardness tester, concrete mixing equipment, electronic strain devices and other similar equipment.

### Engineering Mechanics Laboratory

Mechanics forms the underlying scientific foundation for a wide range of engineering endeavors. It bridges the gap between fundamental science and a wide variety of engineering disciplines. This laboratory is equipped with the basic testing equipment to enhance students' knowledge related to statics, applied physics and calculus.

### Fluid Mechanics & Hydraulics Engineering Laboratories

Fluid Mechanics and Hydraulic Engineering Laboratories deals with the properties of fluids, hydrostatics, fluid kinematics, fluid dynamics and open channel. These labs are equipped with state-of-the-art hydraulic flume, turbines, sediment transport apparatus, hydraulic bench, and other modern and latest equipment.

### Structural Engineering Laboratory

This is a state-of-the-art laboratory and is equipped with the latest equipment for structural analysis and strength of materials. This laboratory provides facility for full scale structural testing, model testing, stress analysis, and material property determination of various materials, systems, and structures. A range of large to small-scale experiments relating to tension, flexural, biaxial, compression, and fracture tests can be conducted.

### Geotechnical and Foundation Engineering Laboratory

The Geotechnical and Foundation Engineering Laboratory is used to perform experiments related to geotechnical engineering. It is also used to apply testing principles to the measurement of fundamental aspects

of soil behavior from classification to engineering properties such as soil compaction, gradation, plasticity index shear strength using direct shear apparatus, tri-axial compression testing, etc.

### Environmental Engineering Laboratory

The Environmental Engineering Laboratory is designed for environmental analyses, including water and wastewater testing and treatability studies along with auxiliary equipment such as an autoclave, incubators, balances, pH meters, and a water purification system. The laboratory is equipped for a broad range of physical, chemical, and biological testing.

### Transportation and Highway Engineering Laboratory

The Transportation and Highway

Engineering Laboratory is equipped to conduct standard tests for asphalt pavement design and paving materials for undergraduate teaching. It supports all standardized tests to assess quality of highway materials and experiments that are conducted in pre-construction, during-construction and post-construction phases of highways. This laboratory contains different equipment used to categorize soil and bitumen binders in terms of their properties and quality control and provides an additional exposure to the testing of highway construction materials for the Civil Engineering students.

### Computer Laboratory

The Computer Engineering Laboratory has a network of the latest computers with CAD/CAM software. The Lab is equipped with core i7 desktops. Students not only attain skills to work on the software, but also utilize the lab

to model their final year projects.

### Survey Store

Survey Store is equipped with measuring instruments for distance, vertical and horizontal angles, and elevation. It is also used for performing leveling surveys and transverse surveys, and for applying corrections to geodetic observations. Latest Total Station, Theodolites, Levels and allied equipment make it a state-of-the-art facility.





## Bachelor in Civil Engineering

### Program Educational Objectives (PEOs)

The graduates of B.Sc. Civil Engineering will demonstrate knowledge of key technologies applicable in the main areas of Civil Engineering. The main objectives of this program are to produce engineers 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 B.Sc. 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 (F.Sc. Pre-Engineering) or Equivalent with Physics, Chemistry and Mathematics securing at least 60% marks in aggregate. In case of foreign qualification, equivalence from IBCC will be required

OR

diploma of Associate Engineer Examination in relevant discipline securing at least 60% marks in aggregate (up to 2% of maximum allowed seats).

- (ii) UCP Admission Test or HEC approved test.

### Degree Requirements

Each candidate for the B.Sc. Civil Engineering degree is required to complete successfully 133 Cr. Hrs. with the minimum CGPA of 2.0 on the scale of 4.0 as per the following detail:



Area	Cr. Hrs.
a) Civil Engineering Foundation Courses	28
b) Civil Engineering Breadth Courses	15
c) Civil Engineering Depth Courses	33
d) Natural Sciences	19
e) Computing Courses	02
f) Inter Departmental Engineering Elective (IDEE)	09
g) Humanities Courses	15
h) Management Courses	06
i) Industrial Internship	00
j) Survey Camp	00
k) Design Project	06
<b>Total</b>	<b>133</b>

#### a) Civil Engineering Foundation Courses (28 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Strength of Materials I	CE2212	2
Strength of Materials I Lab	CE2211	1
Theory of Structures I	CE3233	3
Theory of Structures I Lab	CE3231	1
Civil Engineering Drawing	CE1112	2
Civil Engineering Materials	CE1122	2
Civil Engineering Materials Lab	CE1121	1
Engineering Surveying I	CE1142	2
Engineering Surveying I Lab	CE1152	2
Civil Engineering Drawing & Estimation	CE2181	1
Civil Engineering Drawing & Estimation Lab	CE2182	2
Fluid Mechanics-I	CE2412	2
Fluid Mechanics-I Lab	CE2411	1
Engineering Geology	CE1133	3
Soil Mechanics	CE3512	2
Soil Mechanics Lab	CE3511	1

#### b) Civil Engineering Breadth Courses (15 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Plain and Reinforced Concrete I	CE3262	2
Plain and Reinforced Concrete I Lab	CE3261	1
Engineering Surveying II	CE2172	2
Engineering Surveying II Lab	CE2171	1
Fluid Mechanics II	CE3422	2
Fluid Mechanics II Lab	CE3421	1
Transportation Engineering I	CE4532	2
Transportation Engineering I Lab	CE4531	1
Environmental Engineering I	CE3612	2
Environmental Engineering I Lab	CE3611	1

#### c) Civil Engineering Depth Courses (33 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Steel Structures	CE3242	2
Steel Structures Lab	CE3241	1
Plain and Reinforced Concrete II	CE4272	2
Plain and Reinforced Concrete II Lab	CE4271	1
Design of Structures	CE4201	1
Design of Structures Lab	CE4211	1
Structural Engineering	CE4283	3
Hydraulics Engineering	CE4442	2
Hydraulics Engineering Lab	CE4441	1
Irrigation and Drainage Engineering	CE4452	2
Irrigation and Drainage Engineering Lab	CE4451	1
Geotechnical & Foundation Engineering	CE4522	2
Geotechnical & Foundation Engineering Lab	CE4521	1
Transportation Engineering II	CE4542	2
Transportation Engineering II Lab	CE4541	1
Environmental Engineering II	CE4622	2
Environmental Engineering II Lab	CE4621	1
Strength of Materials II	CE3223	3

Strength of Materials II Lab	CE3221	1
Theory of Structures II	CE3252	2
Theory of Structures II Lab	CE3251	1

#### d) Natural Sciences Courses (19 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Applied Mathematics I	CEMT1013	3
Applied Mathematics II	CEMT1023	3
Applied Mathematics III	CEMT2033	3
Engineering Mechanics	CEME2023	3
Engineering Mechanics Lab	CEME2021	1
Numerical Analysis	CEMT2043	3
Probability and Statistics	CEMT3053	3

#### e) Computing Courses (02 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Computer Programming	CECS1011	1
Computer Programming Lab	CECS1021	1

#### f) Inter Departmental Engineering Elective (09 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Basic Electro Mechanical Engineering	CEME1013	3
Basic Electro Mechanical Engineering Lab	CEME1011	1
Architectural and Town Planning	CE2162	2
Entrepreneurship	CEMG2013	3

#### g) Humanities Courses (15 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
English I	CEHU1033	3
Pakistan Studies	CEHU1023	3
Islamic Studies	CEHU1013	3
English II	CEHU2043	3
English III	CEHU3053	3

#### h) Management Courses (06 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Construction Engineering and Management	CEMG2313	3
Engineering Hydrology	CE3432	2
Engineering Hydrology Lab	CE3431	1

#### i) Industrial Internship (CE4000)

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.

#### j) Survey Camp (CE3100)

Students are required to register, attend and successfully complete a minimum of 2 weeks of Survey Camp following the fourth semester of their degree program. Course CE2172 is a pre-requisites for Survey Camp. A formal evaluation will be carried out and Pass / Fail grade will be awarded to the students.

#### k) Design Project (06 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Civil Engineering Project I	CE4912	2
Civil Engineering Project II	CE4924	4

#### Community Work (CE3000)

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

#### Program Duration

This is a four years 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 B.Sc. Civil Engineering degree is 07 years.



**Scheme of Studies B.Sc. in Civil Engineering****Semester-I (15 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
CEMT1013	Applied Mathematics I	Natural Sciences	3
CEME1013	Basic Electro-Mechanical Engineering	Interdisciplinary	3
CEME1011	Basic Electro-Mechanical Engineering Lab	Interdisciplinary	1
CEHU1013	Islamic studies	Humanities	3
CE1112	Civil Engineering Drawing	CE Foundation	2
CE1122	Civil Engineering Materials	CE Foundation	2
CE1121	Civil Engineering Materials Lab	CE Foundation	1

**Semester-II (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
CEMT1023	Applied Mathematics II	Natural Sciences	3
CECS1011	Computer Programming	Computing	1
CECS1021	Computer Programming Lab	Computing	1
CEHU1033	English I	Humanities	3
CE1142	Engineering Surveying I	CE Foundation	2
CE1152	Engineering Surveying I Lab	CE Foundation	2
CE1133	Engineering Geology	CE Foundation	3
CEHU1023	Pakistan Studies	Humanities	3

**Semester-III (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
CEMT2033	Applied Mathematics III	Natural Sciences	3
CEME2023	Engineering Mechanics	Natural Sciences	3
CEME2021	Engineering Mechanics Lab	Natural Sciences	1
CE2162	Architecture & Town Planning	Interdisciplinary	2
CEMG2013	Entrepreneurship	Interdisciplinary	3
CE2172	Engineering Surveying II	Breadth	2
CE2171	Engineering Surveying II Lab	Breadth	1
CEMG2313	Construction Engineering & Management	Management	3

**Semester-IV (15 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
CEMT2043	Numerical Analysis	Natural Sciences	3
CEHU2043	English II	Humanities	3
CE2212	Strength of Materials I	CE Foundation	2
CE2211	Strength of Materials I Lab	CE Foundation	1
CE2181	Civil Engineering Drawing & Estimation	CE Foundation	1
CE2182	Civil Engineering Drawing & Estimation Lab	CE Foundation	2
CE2412	Fluid Mechanics I	CE Foundation	2
CE2411	Fluid Mechanics I Lab	CE Foundation	1

**Scheme of Studies B.Sc. in Civil Engineering****Semester-V (17 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
CEMT3053	Probability and Statistics	Natural Sciences	3
CE3233	Theory of Structures I	CE Foundation	3
CE3231	Theory of Structures I Lab	CE Foundation	1
CE3242	Steel Structures	Depth	2
CE3241	Steel Structures Lab	Depth	1
CE3223	Strength of Materials II	Depth	3
CE3221	Strength of Materials II Lab	Depth	1
CE3422	Fluid Mechanics II	Breadth	2
CE3421	Fluid Mechanics II Lab	Breadth	1

**Semester-VI (18 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
CE3252	Theory of Structures II	Depth	2
CE3251	Theory of Structures II Lab	Depth	1
CE3262	Plain and Reinforced Concrete I	Breadth	2
CE3261	Plain and Reinforced Concrete I Lab	Breadth	1
CE3432	Engineering Hydrology	Management	2
CE3431	Engineering Hydrology Lab	Management	1
CE3512	Soil Mechanics	CE Foundation	2
CE3511	Soil Mechanics Lab	CE Foundation	1
CE3612	Environmental Engineering I	Breadth	2
CE3611	Environmental Engineering I Lab	Breadth	1
CEHU3053	English III	Humanities	3

**Semester-VII (17 Cr. Hrs.)**

Course Code	Course Title	Category	Cr. Hrs.
CE4272	Plain and Reinforced Concrete II	Depth	2
CE4271	Plain and Reinforced Concrete II Lab	Depth	1
CE4442	Hydraulics Engineering	Depth	2
CE4441	Hydraulics Engineering Lab	Depth	1
CE4522	Geotechnical & Foundation Engineering	Depth	2
CE4521	Geotechnical & Foundation Engineering Lab	Depth	1
CE4532	Transportation Engineering I	Breadth	2
CE4531	Transportation Engineering I Lab	Breadth	1
CE4622	Environmental Engineering II	Depth	2
CE4621	Environmental Engineering II Lab	Depth	1
CE4912	Civil Engineering Project I	Design Project	2



### Scheme of Studies B.Sc. in Civil Engineering

#### Semester-VIII (15 Cr. Hrs.)

Course Code	Course Title	Category	Cr. Hrs.
CE4201	Design of Structures	Depth	1
CE4211	Design of Structures Lab	Depth	1
CE4283	Structural Engineering	Depth	3
CE4452	Irrigation and Drainage Engineering	Depth	2
CE4451	Irrigation and Drainage Engineering Lab	Depth	1
CE4542	Transportation Engineering II	Depth	2
CE4541	Transportation Engineering II Lab	Depth	1
CE4924	Civil Engineering Project II	Design Project	4

## Master of Science in Civil Engineering

### Admission Requirements

- (i) (i) A minimum of 16 years of education leading to BS / BE / B.Sc. in Civil 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)

Each candidate for the M.Sc. Civil Engineering degree is required to successfully earn 30 Cr. Hrs. as per the following detail:

Area	Cr. Hrs.
a) Specialization Courses	18
b) Elective	06
c) Thesis/Project/Additional Courses	06
<b>Total</b>	<b>30</b>

#### a) Specialization Courses

##### i) Structural Engineering

Course Title	Code	Cr. Hrs.
Advanced Structural Analysis	CE5203	3
Structural Dynamics	CE5213	3
Advanced Concrete Technology	CE5223	3
Theory of Plates and Shells	CE5233	3
Conceptual Design of Bridges	CE5243	3
Design of Timber Structures	CE5253	3
Advanced Reinforce Concrete Design	CE6203	3
Finite Element Methods in Engineering	CE6213	3
Earthquake Engineering	CE6223	3
Pre-stressed Concrete	CE6233	3
Steel Structures	CE6243	3
Design of Glass Structures	CE6253	3
Design for Fire Resistance of Structures	CE6263	3

##### ii) Hydraulics & Irrigation Engineering

Course Title	Code	Cr. Hrs.
Design of Hydraulic Structures	CE5403	3
Irrigation Engineering and Practices	CE5413	3
Advanced Fluvial Hydraulics	CE5423	3
River Engineering and Flood Management	CE5443	3
Computer Aided Design of Hydraulic Structures	CE5453	3
Application of RS & GIS	CE5463	3
Water Resources Engineering	CE5473	3
Ground Water Engineering	CE5483	3
Statistical Hydrology	CE5493	3
Advanced Open Channel Hydraulics	CE6403	3
Applied Hydrology	CE6413	3
Sediment Transport	CE6423	3
Hydro Power Engineering	CE6433	3
Drainage Engineering	CE6443	3
Climate Change and Water Resources	CE6463	3
Catchment Modeling	CE6473	3
Hydrometeorology	CE6483	3
Integrated Water Resource Management	CE6493	3

##### iii) Geotechnical Engineering

Course Title	Code	Cr. Hrs.
Advanced Soil Mechanics	CE5503	3
Geotechnical Investigation	CE5513	3
Geotechnical Engineering in Professional Practice	CE5523	3

Advanced Foundation Engineering	CE5533	3
Earth Retaining Structures	CE5543	3
Foundation Engineering	CE6503	3
Dam Engineering	CE6513	3
Soil Improvement Techniques	CE6523	3
Soil Dynamics	CE6533	3
Soil Erosion & Watershed Management	CE6543	3
Rock Engineering	CE6553	3

#### b) Elective Courses

Elective courses (two courses, 6 Cr. Hrs.) can be taken from any specialization with the approval of academic advisor.

#### c) Research Thesis

Course Title	Code	Cr. Hrs.
Research Thesis	CE6916	6
Thesis Continuation	CE6921	1

### CGPA Requirement

A student is required to earn a minimum of 2.50/4.00 CGPA on the completion of his/her degree requirements.

### Program Duration

This is nominally a two-year degree program comprising of 4 semesters. There will be a Fall and a Spring semester in each year. The maximum duration to complete MSc Civil Engineering degree is 04 years.

