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Moving

Engineering

University of Central Punjab

2023-24

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BS **Electrical** Engineering

Admission Requirements 1.1

Higher Secondary School Certificate (F.Sc. Pre-Engineering) or (ICS (i) with Mathematics, Physics) or Equivalent with Physics, Chemistry, and Mathematics securing at least 60% marks in aggregate. In the case of a foreign qualification, equivalence from IBCC will be required. OR

Diploma of Associate Engineer Examination in relevant discipline securing at least 60% marks in aggregate.

(ii) All applicants are required to pass PEC approved test or UCP Admission Test.

Degree Requirements 1.2

Each candidate for the B.Sc. Electrical Engineering degree is required to successfully earn 135/136 Cr. Hrs. with a minimum CGPA of 2.00 on a scale of 4.00 as per the following detail:

	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	18/19
Cou	rses	
f)	Humanities Courses	15
g)	Management Sciences	09
h)	Inter Departmental Engineering Elective (IDEE)	07
i)	Industrial Internship	00
j)	Design Project	06
	Total	135/136

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

Course Title

Electrical Workshop Linear Circuit Analysis Linear Circuit Analysis Lab **Electronic Devices and Circuits** Electronic Devices and Circuits Lab **Electrical Network Analysis** Electrical Network Analysis Lab Digital Logic Design Digital Logic Design Lab Signals and Systems Signals and Systems Lab Probability Methods for Engineers

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

Course Title
Applied Mathematics-I
Applied Physics
Applied Physics Lab
Applied Mathematics-II
Applied Mathematics-III
Multivariable Calculus
Natural Science Elective

Computing Courses (10 Cr. Hrs.) c)

Course Title
Introduction to Computing
Fundamentals of Programming
Fundamentals of Programming Lab
Data Structures and Algorithms
Data Structures and Algorithms Lab

Code	Cr. Hrs.
EE1411	1
EE1813	3
EE1811	1
EE2423	3
EE2421	1
EE2823	3
EE2821	1
EE2313	3
EE2311	1
EE2713	3
EE2711	1
EEMT4053	3

Code	Cr. Hrs.
EEMT1013	3
EE1113	3
EE1111	1
EEMT1023	3
EEMT2033	3
EEMT2063	3
EEXX30x3	3

Code	Cr. Hrs.
EECS1012	2
EECS1023	3
EECS1021	1
EECS2033	3
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

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

Course Title ASIC Design and FPGAs Digital Signal Processing Digital Signal Processing Lab Microcontroller Based Embedded Systems Microcontroller Based Embedded Systems La **Digital Communications** Digital Communications Lab Analog Integrated Electronics VLSI Design Industrial Electronics Digital Electronics Microwave Engineering Microwave Engineering Lab Antenna Theory and Design Wireless Communication Systems Programming Digital Control Systems Numerical Analysis

ii) Computer Engineering

Course Title

Digital Image Processing Computer Vision Introduction to Artificial Intelligence Introduction to Artificial Intelligence Lab Introduction to Data Science Introduction to Data Science Lab Operating Systems Machine Learning Internet of Things

	Code	Cr. Hrs.
	EETEx313	3
	EETEx713	3
	EETEx711	1
	EETEx323	3
d	EETEx321	1
	EETEx523	3
	EETEx521	1
	EETEx423	3
	EETEx333	3
	EETEx343	3
	EETEx353	3
	EETEx533	3
	EETEx531	1
	EETEx543	3
	EETEx553	3
	EECSx043	3
	EETEx613	3
	EEMTx053	3

Co	ode	Cr. H	rs.
EE	ECSx713	3	
EE	ECSx723	3	
EE	ECSx213	3	
EE	ECSx211	1	
EE	ECSx223	3	
EE	ECSx221	1	
EE	ECSx233	3	
EE	ECSx243	3	
EE	ECSx253	3	

iii) Power Engineering

Course Title	Code	Cr. Hrs.
Power Transmission	EEPEx823	3
Power Distribution and Utilization	EEPEx813	3
Power Distribution and Utilization Lab	EEPEx811	1
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

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

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

Management Sciences (09 Cr. Hrs.) g)

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

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

Course Title
Engineering Drawing
Basic Mechanical Engineering
Thermodynamics

Design Project (06 Cr. Hrs.) i)

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

Industrial Internship (EE4000) i)

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.

1.3 Community Work (EE3000)

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

1.4 Programme Duration

This is a four-year degree programme comprising 8 semesters. There will be a Fall and a Spring semester 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.

Code	Cr. Hrs.
EEME1021	1
EEME1033	3
EEME2043	3



Scheme of Studies B.Sc. in Electrical Engineering

Semester-I (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	EECS1012	Introduction to Computing	2	Computing
2.	EE1411	Electrical Workshop	1	EE Foundation
З.	EEMT1013	Applied Mathematics I	3	Natural Sciences
4.	EE1113	Applied Physics	3	Natural Sciences
5.	EE1111	Applied Physics Lab	1	Natural Sciences
6.	EEHU1013	English I	3	Humanities
7.	EEHU1043	Pakistan Studies	3	Humanities

Semester-II (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	EE1813	Linear Circuit Analysis	3	EE Foundation
2.	EE1811	Linear Circuit Analysis Lab	1	EE Foundation
З.	EEME1021	Engineering Drawing	1	IDEE
4.	EEME1033	Basic Mechanical Engineering	3	IDEE
5.	EEMT1023	Applied Mathematics II	3	Natural Sciences
6.	EEHU1053	Islamic Studies	3	Humanities
7.	EECS1023	Fundamentals of Programing	3	Computing
8.	EECS1021	Fundamentals of Programing Lab	1	Computing

Semester-III (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	EECS2033	Data Structures and Algorithms	3	Computing
2.	EECS2031	Data Structures and Algorithms Lab	1	Computing
З.	EE2423	Electronic Devices and Circuits	3	EE Foundation
4.	EE2421	Electronic Devices and Circuits Lab	1	EE Foundation
5.	EE2823	Electrical Network Analysis	3	EE Foundation
6.	EE2821	Electrical Network Analysis Lab	1	EE Foundation
7.	EEME2043	Thermodynamics	3	IDEE
8.	EEMT2033	Applied Mathematics III	3	Natural Sciences

Semester-IV (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	EE2313	Digital Logic Design	3	EE Foundation
	EE2311	Digital Logic Design Lab	1	EE Foundation
2.	EE2713	Signals and Systems	3	EE Foundation
З.	EE2711	Signals and Systems Lab	1	EE Foundation
4.	EE2833	Electrical Machines	3	EE Core
5.	EE2831	Electrical Machines Lab	1	EE Core
6.	EEMT2063	Multivariable Calculus	3	Natural Sciences
7.	EEHU2023	English II	3	Humanities

Semester-V (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	EE3323	Introduction to Embedded Systems	3	EE Core
2.	EE3331	Introduction to Embedded Systems	1	EE Core
		Lab		
З.	EE3523	Electromagnetic Field Theory	3	EE Core
4.	EEXX3xx3	Breadth Core I	3	EE Core
5.	EEXX3xx1	Breadth Core I Lab	1	EE Core
6.	EE3533	Communication Systems	3	EE Core
7.	EE3531	Communication Systems Lab	1	EE Core
8.	EEXX30x3	Natural Science Elective*	3	Natural Sciences

*Discrete Mathematics (EEMT3083)/ Numerical Analysis (EEMT3093)/ Biology(EEBI3013)

Semester-VI (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	EEXX3xx3	Breadth Core II	3	EE Core
2.	EEXX3xx1	Breadth Core II Lab	1	EE Core
	EEXX3xx3	Depth Elective I	3	EE Elective
З.	EEXX3xx1	Depth Elective I Lab	1	EE Elective
4.	EE3613	Linear Control Systems	3	EE Core
5.	EE3611	Linear Control Systems Lab	1	EE Core
6.	EEMG3013	Engineering Economics	3	Management
7.	EEHU3033	English III	3	Humanities

Semester-VII (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	EEXX4xx3	Depth Elective II	3	EE Elective
2.	EEXX4xx1	Depth Elective II Lab	1	EE Elective
З.	EEXX4xxx	Depth Elective III	3/4	EE Elective
4.	EEMG4033	Entrepreneurship	3	Management
5.	EEMT4053	Probability for Engineers	3	EE Foundation
6.	EE4912	Design Project I	2	Design Project

Semester-VIII (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	EEXX4xx3	Depth Elective IV	3	EE Elective
2.	EEXX4xx1	Depth Elective IV Lab	1	EE Elective
	EEXX4xx3	Depth Elective V	3	EE Elective
З.	EEMG4043	Engineering Management	3	Management
4.	EED4924	Design Project II	4	Design Project



M.Sc. Electrical Engineering

2.1 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 the annual system
- (iii) All applicants are required to pass UCP Admission Test and interview

2.2 Degree Requirements

A student admitted to 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)

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

a) Core Courses

Course Title	Code	Cr. Hrs.
Linear System Theory	EE5553	3
Advanced Probability	EE5573	3

b) Specialization Courses

Course Title

Power Convertors Photovoltaic Based Energy Systems Electric Power System Stability Advanced Power Electronics High Voltage Engineering Renewable Energy, Technology & System Switch Mode Power Supplies Power Systems Analysis & Design Nonlinear Systems & Control Distributed Control of Multiagent Systems Testing & Diagnostics of High Voltage Power Equipment

ii) Electronics and Telecommunication Specialization

Course Title

Satellite Communication Systems High Frequency Systems & Analysis Advance Analog & Digital Communication Sys Modern Communication Theory Analog & digital Filter Design Telecom Networks & Tele-Traffic Engineering Advance Antenna Design & Analysis Wireless Networks

c) Elective Courses

Course Title

Random Processes in Engineering Graph Theory & Network Optimization Advanced Digital System & Design

Code	Cr. Hrs.
EE5523	3
EE5533	3
EE6913	3
EE5643	3
EE5653	3
EE 6943	3
EE5793	3
EE5813	3
EE5763	3
EE5623	3
EE5943	3

	Code	Cr. Hrs.
	EE5723	3
	EE5503	3
stem	EE5583	3
	EE5593	3
	EE5613	3
	EE5753	3
	EE6963	3
	EE5803	3

Code	Cr. Hrs.
EE5573	3
EE5213	3
EE5353	3

Course Title	Code	Cr. Hrs.
Advanced Digital Signal Processing	EE6743	3
High Reliability Embedded Systems	EE6733	3
Expert System	EE5663	3
Linear Programming	EE5693	3

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

e) Research Thesis

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

2.3 Degree Requirement

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

2.4 Programme Duration

This is nominally a two-year degree programme comprising 4 semesters. There will be a Fall and a Spring semester each year. The maximum duration to complete an 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 a PhD programme in Electrical Engineering which covers a wide spectrum of fields keeping up with the fast pace of technological advancement. Its carefully designed nominally two-year degree Ph.D. programme 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 the industry.

Admission Requirements 3.1

(i) M.Sc. degree in relevant discipline

(ii) Minimum CGPA 3.00/4.00 (Semester System) or 60% marks (Annual System)

(iii) All applicants are required to pass UCP Admission Test and interview

3.2 Degree Requirements

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

- 18 Cr. Hrs. Course Work with minimum CGPA 3.00/4.00 (j)
- Comprehensive Examination (written and oral) (ii)
- (iii) Synopsis Defense

(iv) 30 Cr. Hrs. dissertation

(v) Publication of at least one research paper in HEC approved W-category journal

- Dissertation Foreign Reviews (v_i)
- (vii) Dissertation Final Defense

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

Activity

Course Work Comprehensive Exam Synopsis Qualification Thesis Submission

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Preferred Time	Maximum	
2 Semesters	3 Semesters	
3 Semesters	4 Semesters	
4 Semesters	6 Semesters	
6 Semesters	14 Semesters	
	(7 Years)	

Scheme of Studies B.Sc. Robotics & Intelligent Systems

Semester-I (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.
1.	RCS 101	Fundamental of Programming	3
2.	RCS 102	Fundamental of Programming Lab	1
З.	RME 101	Engineering Mechanics – I	3
4.	RMT 101	Math I	3
5.	ENG 101	English I	3
6.	RME 100	Computer-Aided Design	1
7.	ENT 101	Fundamentals of Entrepreneurship	1

Semester-II (19 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.
1.	RCS 111	Object Oriented Programming	3
2.	RCS 112	Object-Oriented Programming Lab	1
З.	REE 101	Basic Electrical Engineering	3
4.	REE 102	Basic Electrical Engineering Lab	1
5.	RMT 111	Math II	3
6.	RME 102	Engineering Mechanics – II	3
7.	ENG 102	English II	3
8.	PAK 101	Pakistan Studies	2

Semester-III (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.
1.	RCS 221	Data Structures &Algorithms	3
2.	RCS 222	Data Structures &Algorithms Lab	1
З.	REE 201	Electronics I	3
4.	REE 202	Electronics I Lab	1
5.	REE 211	Electrical Machines	3
6.	REE 212	Electrical Machines Lab	1
7.	ISL 201	Islamic Studies/Ethics	2
8.	RMT 221	Math III	3

Semester-IV (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.
1.	REE 213	Introduction to Robotics	3
2.	REE 214	Introduction to Robotics Lab	1
3.	REE 221	Digital Logic Design	3
4.	REE 222	Digital Logic Design Lab	1
5.	RMT 231	Probability and Random Processes	3
6.	ENG 203	English III	3
7.	REE 223	Sensors & Transducers	3
	1		

Semester-V (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.
1.	RCS 331	Operating Systems	3
2.	RCS 332	Operating Systems Lab	1
З.	REE 331	Electronics II	3
4.	REE 332	Electronics II Lab	1
5.	RMT 331	Numerical Computing	3
6.	RME 321	Actuators	3
7.	RME 322	Actuators Lab	1
8.	CLB 301	Career Lab	1

Semester-V1 (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.
1.	REE 351	Feedback Control System	3
2.	REE 352	Feedback Control System Lab	1
3.	REE 341	Embedded Systems	3
4.	REE 342	Embedded Systems Lab	1
5.	RME 331	Robotics Machine Design	3
6.	RMG 301	Engineering Economics	3
7.	REE 332	Robotics Design Lab – II	1
8.	REE 300	Industrial Internship	0

Semester-VI1 (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.
1.	REE 401	Final Year Project - I	2
2.	REE 4xx	Elective – II	3
З.	REE 4xx	Elective – II Lab	1
4.	REE 461	Adaptive Control	3
5.	REE 451	Artificial Intelligence	3
6.	REE 442	Robotics Design Lab – III	1
7.	REE 4xx	Elective – III	3
	1		

Semester-VII1 (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.
1.	REE 412	Final Year Project - II	4
2.	REE 4xx	Elective – IV	3
З.	REE 4xx	Elective – IV Lab	1
4.	REE 4xx	Elective - V	3
5.	REE 4xx	Elective – V Lab	1
6.	REE 4xx	Elective VI	3

International Outreach and Research Impact

International Collaborations

The Department of Electrical Engineering at the University of Central Punjab is closely working with international collaborators from renowned universities around the globe. Under different capacities, the Department of Electrical Engineering is collaborating with the University of Chicago (USA), the University of Quebec (Canada), Queen Mary University of London (UK), the University of Wuzburg (Germany), Taif University (KSA), Federal University of Lavras (Brazil), Instituto de Telecomunicações Aveiro (Portugal), Chulalongkorn University (Thailand) to name a few.

Alumni Success Stories

Our alumni are working in various top universities such as UC Berkeley, UC Davis, UC Los Angeles, Politecnico di Torino, Karlstad University, ISEA, RWTH University etc. Our alumni are working in one of the best companies in the world such as Google, Morgan Stanley, Tractebel Engie, LESCO, and NESPAK.

Research Publications

The Department of Electrical Engineering is actively involved in Research and Development activities. Since 2018, we have successfully published more than 120 journal papers and 35+ international conferences. It is a matter of great pride for our department that the total impact factor produced by the Electrical Engineering Department is more than 275.

International Grants and Patents

Faculty members and students have successfully secured funding from various national and international bodies/donors such as The Belt and Road Initiative, IGNITE, and Asia Connect to name a few. Faculty members have successfully filled patents in Pakistan and we are hopeful to have international patents soon.

B.Sc. Mechanical Engineering

4.1 Programme Educational Objectives (PEOs)

In line with the mission statement of FOE, the Department of Mechanical Engineering (MED) has adopted the following Program Educational Objectives (PEOs), ensuring the involvement of all stakeholders.

PEO 1: Possess knowledge and skills for design, analysis and solution of a broad range of Mechanical Engineering applications.

PEO 2: Demonstrate knowledge for sustainable development of society ethically and professionally.

PEO 3: Communicate effectively and possess management skills to work in multidisciplinary teams.

4.2 Programme Learning Outcomes (PLOs)

The Graduate Attributes (GAs) provided in the "PEC Engineering Accreditation Board Third Edition, published in 2019 (Amended Ver. of Accreditation Manual- 2014)" have been adopted as Program Learning Outcomes (PLOs) for the Mechanical Engineering Program. At the time of graduation, the graduates of B.Sc. ME programme will possess the following knowledge and skill attributes:

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

(i) Engineering Knowledge:

An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

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(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 the information to derive valid conclusions.

(v) Modern Tool Usage:

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 the information to derive valid conclusions.

(vi) The Engineer and Society:

An ability to apply to reason informed by con textual 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, in 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 work, as a member and/or leader in a team, to manage projects in a multidisciplinary environment.

(xii) Lifelong Learning:

An ability to recognise the importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

4.3 Admission Requirements

(i) Higher Secondary School Certificate (F.Sc. Pre-Engineering) or (ICS with Physics, Mathematics & Computer Science) 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.

(ii) All applicants are required to pass UCP Admission Test

4.4 Degree Requirements

Each candidate for the B.Sc. Mechanical Engineering degree is required to successfully complete 135 Cr. Hrs. with the minimum CGPA of 2.00 on the scale of 4.00 as per the following detail:

Area	

- Mechanical Engineering Foundation Co a) b) Mechanical Engineering Breadth Cours C) Mechanical Engineering Depth Courses d) Natural Sciences e) Computing Courses f) Inter Departmental Engineering Elective g) Humanities Courses h) Management Sciences i) Mechanical Engineering Elective Cours j) Industrial Internship
- k) Design Project

Total

	Cr. Hrs.
ourses	29
ses	30
5	22
	14
	02
es (IDEE)	6
	13
	13
es	04
	00
	06
	135

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

Course Title	Code	Cr. Hrs.
Engineering Drawing	MEL1011	1
Introduction to Engineering	ME1011	1
Engineering Graphics	MET1211	1
AutoCAD	ME1211	1
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 Mechanics-II	ME2532	2
Engineering Mechanics-II Lab	ME2531	1
Engineering Materials	ME1613	3
Manufacturing Processes-I	ME2812	2

b) Mechanical Engineering Breadth Courses (30 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Mechanics of Machines-II	ME2232	2
Machine Design-I	ME2242	2
Mechanics of Materials-II	ME2543	3
Mechanics of Materials-II Lab	ME2541	1
Machine Design-II	ME2253	3
Machine Design-II Lab	ME2251	1
Manufacturing Processes-II	ME3822	2
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
Instrumentation & Control	MEEE4033	3
Instrumentation & Control Lab	MEEE4031	1
Heat & Mass Transfer	ME3432	2
Heat & Mass Transfer Lab	ME3431	1

c) Mechanical Engineering Depth Courses (22 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
IC Engines	ME3443	3
IC Engines Lab	ME3441	1
Technical Elective-I	ME3	2
Technical Elective-II	ME4	2
Engineering Maintenance and Failure Analysis	ME4563	3
Finite Element Analysis	ME4262	2
Finite Element Analysis Lab	ME4261	1
Mechanisms & Mechanical Vibrations Lab	ME4551	1
Refrigeration and Air-Conditioning	ME4463	3
Refrigeration and Air-Conditioning Lab	ME4461	1
Power Plants	ME4453	3

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

Course Title

Applied Mathematics I Applied Physics Applied Mathematics II Applied Mathematics III Numerical Analysis

e) Computing Courses (02 Cr. Hrs.)

Course Title Computer System and Programming Computer System and Programming Lab

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

Course Title Basic Electrical Engineering Basic Electrical Engineering Lab Industrial Electronics Industrial Electronics Lab

(Code	Cr. Hrs.
1	MEMT1013	3
1	ME1113	3
1	MEMT1023	3
1	MEMT2043	3
1	MEMT3053	3

Code	Cr. Hrs.
MECSL1011	1
MECST1011	1

Code	Cr. Hrs.
MEEE3012	2
MEEE3011	1
MEEE3022	2
MEEE3021	1

g) Humanities Courses (13 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
English I	ENG101	3
English II	ENG102	3
English III	ENG203	2
English III Lab	ENGL203	1
Islamic Studies	ISL201	2
Pakistan Studies	PAK101	2

h) Management Sciences (13 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Management Elective-I	MEMG3	2
Entrepreneurship	MEMG3022	2
Metrology and Quality Assurance	MEMG4073	3
Metrology and Quality Assurance Lab	MEMG4071	1
Management Elective -II	MEMG4	2
Health Safety and Environment	MEMG3042	2
Career Lab	CBL301	1

i) Elective Courses (04 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Renewable Energy Technology	ME3472	2
Gas Dynamics	ME3732	2
CFD	ME3752	2
Mechanical Vibrations	ME4552	2
Introduction to Mechatronics	ME4272	2
Automation and Robotics	ME4282	2
Nuclear Engineering	ME4482	2
Mechanical Engineering Design	ME4292	2

j) Management Elective Courses (04 Cr. Hrs.)

Course Title	Code	Cr. Hrs.
Industrial Management and Economics	MEMG3052	2
Total Quality Management	MEMG3082	2
Operations Management	MEMG4092	2
Project Management	MEMG4032	2
Engineering Law	MEG4022	2

k) Industrial Internship (ME4000)

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

I) 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 for 6 credit hours and will be completed in 4th year, i.e., 7th and 8th semesters.

Course Title	
Final Year Project-I	
Final Year Project-II	

4.5 Community Work (ME3000)

All students shall be compulsorily rendering 65 hours of voluntary social work during the course of studies, which is a prerequisite for the award of a degree.

4.6 Programme Duration

The programme 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 staring in February/March.

Code	Cr. Hrs.
ME4912	2
ME4924	4

Scheme of Studies B.Sc. in Mechanical Engineering

Semester-I (16 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	ENG101	English- I	3	Humanities
2.	MEMT1013	Applied Mathematics-I	3	Natural
				Sciences
З.	ME1112	Applied Physics	2	Natural
				Sciences
4.	ME1613	Engineering Materials	3	Foundation
5.	MEL1011	Engineering Drawing	1	Foundation
6.	MET1211	Engineering Graphics	1	Foundation
7.	MECST1011	Computer System and Programming	1	Computing
8.	MECSL1011	Computer System and Programming	1	Computing
		Lab		
9.	ME1011	Introduction to Engineering	1	Foundation

Semester-II (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	ENG102	English II	3	Humanities
2.	ME1413	Applied Thermodynamics – I	3	Foundation
З.	MEMT1023	Applied Mathematics -II	3	Natural
				Sciences
4.	PAK101	Pakistan Studies	2	Humanities
5.	ME1513	Engineering Mechanics – I	3	Foundation
6.	MEL1211	AUTO CAD Lab	1	Foundation
7.	ME1312	Workshop Technology	2	Foundation

Semester-III (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	ME2223	Mechanics of Machines – I	3	Foundation
2.	ENG203	English III	2	Humanities
З.	ENGL203	English III Lab	1	Humanities
4.	ME2423	Applied Thermodynamics – II	3	Breadth
5.	ME2421	Applied Thermodynamics – II	1	Breadth
		Lab		
5.	ME2523	Mechanics of Materials-I	3	Foundation
6.	ME2242	Machine Design – I	2	Breadth
7.	ME2532	Engineering Mechanics – II	2	Foundation
8.	ME2531	Engineering Mechanics – II Lab	1	Foundation

Semester-IV (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	ME2812	Manufacturing Processes – I	2	Foundation
2.	ME2232	Mechanics of Machines II	2	Breadth
З.	ME2713	Fluid Mechanics – I	3	Foundation
4.	ME2543	Mechanics of Materials – II	3	Breadth
5.	ME2541	Mechanics of Materials – II	1	Breadth
		Lab		
6.	ME2253	Machine Design - II	3	Breadth
7.	ME2251	Machine Design - II Lab	1	Breadth
8.	ISL201	Islamic Studies	2	Humanities

Semester-V (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	ME3723	Fluid Mechanics – II	3	Breadth
2.	ME3721	Fluid Mechanics – II Lab	1	Breadth
З.	MEEE3012	Basic Electrical Engineering	2	Inter Departmental
				Engineering
				Electives
4.	MEEE3011	Basic Electrical Engineering Lab	1	Inter Departmental
				Engineering
				Electives
5.	MEMG3042	Health, Safety & Environment	2	Management
				Sciences
6.	MEMT3043	Applied Mathematics III	3	Natural
				Sciences
7.	ME3822	Manufacturing Processes – II	2	Breadth
8.	ME3821	Manufacturing Processes – II	1	Breadth
		Lab		
9.	MEMG	Management Elective I	2	Management
				Sciences

Semester-VI (18 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	MEMG3022	Entrepreneurship	2	Management
				Sciences
2.	ME3432	Heat & Mass Transfer	2	Breadth
З.	ME3431	Heat & Mass Transfer Lab	1	Breadth
4.	MEEE3022	Industrial Electronics	2	Inter Departmental
				Engineering
				Electives
5.	MEEE3021	Industrial Electronics Lab	1	Inter Departmental
				Engineering
				Electives
6.	ME3443	IC Engines	3	Depth
7.	ME3441	IC Engines Lab	1	Depth
8.	CBL301	Career Lab	1	Management
				Sciences
FOE	Handbook 202	3-24		

S. No	Course Code	Course Title	Cr. Hrs.	Туре
9.	ME3052	Numerical Analysis	2	Natural
				Sciences
10.	ME3051	Numerical Analysis Lab	1	Natural
				Sciences
11.	ME	Technical Elective I	2	Depth

Semester-VII (17 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	MEEE4033	Instrumentation & Control	3	Inter Departmental
				Engineering
				Electives
2.	MEEE4031	Instrumentation & Control Lab	1	Inter Departmental
				Engineering
				Electives
З.	ME4262	Finite Element Analysis	2	Depth
4.	ME4261	Finite Element Analysis Lab	1	Depth
5.	ME4563	Engineering Maintenance and	З	Depth
		Failure Analysis		
6.	ME4551	Mechanisms & Mechanical	1	Depth
		Vibrations Lab		
7.	ME4912	Final Year Project	2	Design Project
8.	ME4463	Refrigeration & Air-	3	Depth
		conditioning		
9.	ME4461	Refrigeration & Air-	1	Depth
		conditioning Lab		

Semester-VIII (15 Cr. Hrs.)

S. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	MEMG	Management Elective II	2	Management
				Sciences
2.	MEMG4073	Metrology & Quality	3	Management
		Assurance		Sciences
З.	MEMG4071	Metrology & Quality	1	Management
		Assurance Lab		Sciences
4.	ME4453	Power Plants	3	Depth
5.	ME	Technical Elective -II	2	Depth
6.	ME4924	Final Year Projects	4	Design
				Project

Total Credit Hours

135





M.Sc **Mechanical** Engineering

5.1 **Admission Requirements**

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

- Minimum 2.00/4.00 CGPA or 50% marks (ii)
- All applicants are required to pass UCP Admission Test and interview (iii)

5.2 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:

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

	Aroa
	Ared
a)	Core Courses
b)	Specialization Courses
C)	Elective
d)	Thesis/Project/Additional Courses
	Total

Core Courses a)

Course Title

Research Methodology Modeling and Simulation

Cr. Hrs.
06
15
03
06
 30

Code	Cr. Hrs.
ME5013	3
ME6023	3
FOE Har	ndbook 2023-24

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.

Theory of Plates and Shells Design of Machine Tools **Engineering Plasticity** Mechanics of Composite Materials Solar Energy Utilization Energy Management Advanced Propulsion Energy Systems Solar Energy Utilization Advanced Heat and Mass Transfer Boiling and Condensation Heat Transfer Industrial Air Conditioning and Refrigeration Design of Industrial Boilers and Furnaces Fuel Cell Technology Turbulent Flow Boundary Layer Theory Two Phase Flow Theory of Granular Flows Gradient Optimization Techniques Nano Fabrication and Manufacturing Quality Engineering and Management Product Life Cycle Management Productivity Engineering Experimental Methods Scheduling and Sequencing Theory of Metal Cutting

d) Research Thesis

Course Title

Research Thesis Thesis Continuation

5.3 CGPA Requirement

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

5.4 Programme Duration

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

Code	Cr. Hrs.
ME6253	3
ME6263	З
ME6273	3
ME6283	3
ME6443	3
ME6453	3
ME6463	3
ME6473	3
ME6443	3
ME6513	3
ME6523	3
ME6533	3
ME6543	3
ME6553	3
ME6743	3
ME6753	3
ME6763	3
ME6573	3
ME6833	3
ME6843	3
ME6853	3
ME6863	3
ME6873	3
ME5313	3
ME6883	3
ME6893	3

С	ode	Cr. Hrs.	
N	1E6916	6	
N	1E6921	1	

Ph.D **Mechanical** Engineering

Admission Requirements 6.1

An applicant desirous of admission in a PhD program shall be required to meet the following minimum eligibility criteria:

- MS/MPhil degree in the Mechanical / Mechatronics / Industrial / Aerospace / Engineering or a relevant engineering discipline (the relevance will be decided by the graduate admission committee) from a degree-awarding institution recognized by the Higher Education Commission (HEC) of Pakistan; and if applicable, Pakistan Engineering Council (PEC). The candidate will have to provide his PEC registration certificate.
- If an applicant from a different discipline has a strong interest in pursuing a PhD in Mechanical Engineering degree and, by the department's policy, the admissions committee is satisfied that the applicant's prior education has sufficiently prepared him or her to undertake the course of studies of the doctoral program (or, in the opinion of the admissions committee, the preparation can be deemed satisfactory by taking a few additional courses after starting the program), the applicant shall be considered for admission notwithstanding their prior qualification in a different discipline
- At least 3.0 (on a scale of 4.0) Cumulative Grade Point Average (CGPA) in the MS/MPhil degree or 60% aggregate marks if the degree is earned from an annual system; and qualify for University admission test or
- HEC-approved test with a minimum 70% marks.
- A PhD applicant having MS/MPhil degree from abroad shall submit an equivalence certificate from the HEC indicating his/her academic eligibility for admission to the PhD program.

- An applicant who has already completed a part of PhD credit hours (Cr. Hrs.) in another HEC recognized University may be eligible for admission subject to the following conditions:
- No transfer of Cr. Hrs. against research work shall be made; and
- The University shall have the exclusive right to accept or reject the request for transfer of Cr. Hrs. against coursework.
- As part of the application for admission to PhD programs, applicants shall be required to submit a statement of purpose, which shall form an integral part of the application. The graduate admissions committee shall use the information provided to ascertain the preparedness and interest of the candidate in pursuing doctoral studies, and whether the department has the requisite resources to train and supervise the doctoral candidate in the subspecialty he or she is interested in.
- The admission of an applicant to the PhD program shall be subject to the approval of the Board of advanced studies and Research (BASR).

6.2 Programme Duration

The minimum duration for the PhD degree shall be three (03) years and the maximum allowable duration, inclusive of semester breaks, shall be eight (08) years from the date of admission. However, the BASR can relax the upper limit to a maximum of one year.

6.3 Degree Requirements

A PhD scholar shall be required to successfully complete the following requirements:

- 18 Cr. Hrs. course work; (i)
- (ii) 30 Cr. Hrs. research work;
- comprehensive examination; (iii)
- (iv) research work synopsis;
- dissertation foreign reviews; (\vee)

(vi) publication of at least one research paper as first author during his/her doctoral studies in an HEC approved W category (or as per UCP guidelines as communicated time to time in accordance with HEC requirements) research journal for the award of degree, and (vii) dissertation defense.

A student has to fulfill the residency requirement of at least 02 years at the university. The timeline of various milestones is defined in the table given below.

Activity	Preferred Time (by the end of)	Maximum Time (by the end of)
Course Work	2nd Semester	3 Semesters
Comprehensive Exam	3rd Semester	4 Semesters
Synopsis Qualification	4th Semester	6 Semesters
Thesis Submission	7th Semester	14 Semesters (7 Years)

A PhD scholar shall cease to continue his/her studies if he/she fails to complete 18 Cr. Hrs. coursework within four regular semesters with at least 3.00/4.00 CGPA.

The PhD degree shall be awarded after a minimum of **three (3) years** and not more than eight (8) years after the enrollment of the student; provided that for students who are unable to complete the program within **eight (8) years**, the university may designate a competent authority to determine whether the delay was caused by circumstances beyond the student's control, and if so, grant an extension in such exceptional circumstances; however, in no event shall the PhD degree be awarded more than **ten (10) years** after the enrolment of the student in the program. The date of notification of the award of the PhD degree subsequent to the PhD defense shall be considered to be the date of the completion of PhD studies.

Scheme of Studies Ph.D in Mechanical Engineering

Semester-I (09 Cr. Hrs.)

Sr. No.	Courses	Cr. Hrs.
i)	Course - I	3
ii)	Course - II	3
iii)	Course - III	3

Semester-II (09 Cr. Hrs.)

Sr. No.	Courses
i)	Course - IV
ii)	Course - V
iii)	Course - VI

Semester-III (09 Cr. Hrs.)

Sr. No.	Courses
i)	Research Thesis
ii)	Comprehensive Exam
iii)	Synopsis defense

Semester-IV (30 Cr. Hrs.)

Sr. No.	Courses	Cr. Hrs.
i)	Research Thesis	30

Cr. Hrs.
3
3
3

Cr. Hrs.
06
00
00

A PhD student will have to choose six courses from the following courses after consultation with his thesis supervisor and approval of HoD. If considered necessary by the thesis supervisor and approved by the dean, a PhD candidate might complete not more than 02 courses from another department of the Faculty of Engineering or another faculty of the UCP.

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Design Optimization and Analysis Techniques	ME7013	3
2.	Project Management	ME7023	3
З.	Experimental measurements and data analysis	ME7313	3
4.	System Dynamics and Controls	ME7813	3
5.	Robotics and Parallel Mechanisms	ME7823	3
6.	Turbulence Modelling	ME 7713	3
7.	Transport Processes in Energy Systems	ME7723	3
8.	Welding & Non-destructive Testing	ME7833	3
9.	Advanced Power Plant Systems	ME7413	3
10.	Hydrogen and Fuel Cell Engineering	ME7433	3
11.	Combustion and Environment	ME7423	3
12.	Materials for High Temperature Applications	ME7843	3

List of MSc courses that a PhD candidate can enroll if he has not already studied during his MSc studies is given in the table below:

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Modeling and Simulation	ME5013	3
2.	Research Methodology	FE5023	3
З.	Welding and Joining processes	ME6233	3
4.	Mechanics of Fracture and Fatigue	ME5213	3
5.	Advanced Mechanical Vibrations	ME6223	3
6.	Advanced Stress Analysis	ME6243	3
7.	Theory of Plates and Shells	ME6253	3
8.	Engineering Plasticity	ME6273	3
9.	Mechanics of Composite Materials	ME6283	3
10.	Automotive Powertrains	ME5413	3
11.	Advanced Thermodynamics	ME5423	3
12.	Renewable Energy Systems	ME6433	3
13.	Solar Energy Utilization	ME6443	3
14.	Energy Systems	ME6473	3

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Advanced Heat and Mass Transfer	ME7971	3
2.	CFD for Engineering Applications	ME6513	3
З.	Aerodynamics	ME6713	3
4.	Gas Dynamics	ME6723	3
5.	Robotics and Control	ME6733	3
6.	Quality Engineering and Management	ME6823	3
7.	Selected topics in Mechanical Engineering	ME6853	3
8.	Research Thesis	ME6903-6993	6
9.	Thesis Continuation	ME7916-7956	0



B.Sc. Civil Engineering

7.1 Admission Requirements

(i) Higher Secondary School Certificate (F.Sc. Pre-Engineering) or (ICS with Physics, Mathematics & Computer Science) or equivalent with Physics, Chemistry and Mathematics securing at least 60% marks in aggregate. In case of a foreign qualification, equivalence from IBCC will be required

OR

diploma of Associate Engineer Examination in relevant discipline securing at least 60% marks in aggregate.

(ii) UCP Admission Test or HEC approved test.

7.2 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
	Total	133

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

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Strength of Materials I	CE2212	2
2.	Strength of Materials I Lab	CE2211	1
З.	Theory of Structures I	CE3233	3
4.	Theory of Structures I Lab	CE3231	1
5.	Civil Engineering Drawing	CE1112	2
6.	Civil Engineering Materials	CE1122	2
7.	Civil Engineering Materials Lab	CE1121	1
8.	Engineering Surveying I	CE1142	2
9.	Engineering Surveying I Lab	CE1152	2
10.	Civil Engineering Drawing & Estimation	CE2181	1
11.	Civil Engineering Drawing & Estimation Lab	CE2182	2
12.	Fluid Mechanics-I	CE2412	2
13.	Fluid Mechanics-I Lab	CE2411	1
14.	Engineering Geology	CE1133	З
15.	Soil Mechanics	CE3512	2
16.	Soil Mechanics Lab	CE3511	1

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

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Plain and Reinforced Concrete I	CE3262	2
2.	Plain and Reinforced Concrete I Lab	CE3261	1
З.	Engineering Surveying II	CE2172	2
4.	Engineering Surveying II Lab	CE2171	1
5.	Fluid Mechanics II	CE3422	2
6.	Fluid Mechanics II Lab	CE3421	1
7.	Transportation Engineering I	CE4532	2
8.	Transportation Engineering I Lab	CE4531	1
9.	Environmental Engineering I	CE3612	2
10.	Environmental Engineering I Lab	CE3611	1

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

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Steel Structures	CE3242	2
2.	Steel Structures Lab	CE3241	1
З.	Plain and Reinforced Concrete II	CE4272	2
4.	Plain and Reinforced Concrete II Lab	CE4271	1
5.	Design of Structures	CE4201	1
6.	Design of Structures Lab	CE4211	1
7.	Structural Engineering	CE4283	3
8.	Hydraulics Engineering	CE4442	2
9.	Hydraulics Engineering Lab	CE4441	1
10.	Irrigation and Drainage Engineering	CE4452	2
11.	Irrigation and Drainage Engineering Lab	CE4451	1
12.	Geotechnical & Foundation Engineering	CE4522	2
13.	Geotechnical & Foundation Engineering Lab	CE4521	1
14.	Transportation Engineering II	CE4542	2
15.	Transportation Engineering II Lab	CE4541	1
16.	Environmental Engineering II	CE4622	2
17.	Environmental Engineering II Lab	CE4621	1
18.	Strength of Materials II	CE3223	3
19.	Strength of Materials II Lab	CE3221	1
20.	Theory of Structures II	CE3252	2
21.	Theory of Structures II Lab	CE3251	1

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

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Applied Mathematics I	CEMT1013	3
2.	Applied Mathematics II	CEMT1023	3
З.	Applied Mathematics III	CEMT2033	3
4.	Engineering Mechanics	CEME2023	3
5.	Engineering Mechanics Lab	CEME2021	1
6.	Numerical Analysis	CEMT2043	3
7.	Probability and Statistics	CEMT3053	3

e) Computing Courses (02 Cr. Hrs.)

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Computer Programming	CECS1011	1
2.	Computer Programming Lab	CECS1021	1

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

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Basic Electro Mechanical Engineering	CEME1013	3
2.	Basic Electro Mechanical Engineering Lab	CEME1011	1
З.	Architectural and Town Planning	CE2162	2
4.	Entrepreneurship	CEMG2013	3

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

Sr. No.	Course Title	Code	Cr. Hrs.
1.	English-I	CEHU1033	3
2.	Pakistan Studies	CEHU1023	3
З.	Islamic Studies	CEHU1013	3
4.	English-II	CEHU2043	3
5.	English-III	CEHU3053	3

Management Courses (06 Cr. Hrs.) h)

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Construction Engineering and Management	CEMG2313	3
2.	Engineering Hydrology	CE3432	2
З.	Engineering Hydrology Lab	CE3431	1

Industrial Internship (CE4000) **i**)

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 (CE3000)

Students are required to register, attend and complete a minimum of 2 weeks of Survey Camp following the fourth semester of their degree programme.

k) Design Project (06 Cr. Hrs.)

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Civil Engineering Project I	CE4912	2
2.	Civil Engineering Project II	CE4924	4

7.3 CommunityWork (CE3100)

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

7.4 Programme Duration

This is a four years degree programme comprising 8 semesters. There will be a Fall and a Spring semester 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. Course CE2172 is a pre-requisite for Survey Camp. A formal evaluation will be carried out and Pass / Fail grades will be awarded to the students.

Scheme of Studies B.Sc. in Civil Engineering

Semester-I (15 Cr. Hrs.)

Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	CEMT1013	Applied Mathematics I	3	Natural Sciences
2.	CEME1013	Basic Electro-Mechanical	3	Interdisciplinary
		Engineering		
З.	CEME1011	Basic Electro-Mechanical	1	Interdisciplinary
		Engineering Lab		
4.	CEHU1013	Islamic studies	3	Humanities
5.	CE1112	Civil Engineering Drawing	2	CE Foundation
6.	CE1122	Civil Engineering Materials	2	CE Foundation
7.	CE1121	Civil Engineering Materials Lab	1	CE Foundation

Semester-II (18 Cr. Hrs.)

Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	CEMT1023	Applied Mathematics II	3	Natural Sciences
2.	CECS1011	Computer Programming	1	Computing
З.	CECS1021	Computer Programming Lab	1	Computing
4.	CEHU1033	English I	3	Humanities
5.	CE1142	Engineering Surveying I	2	CE Foundation
6.	CE1152	Engineering Surveying I Lab	2	CE Foundation
7.	CE1133	Engineering Geology	3	CE Foundation
8.	CEHU1023	Pakistan Studies	3	Humanities

Semester-III (18 Cr. Hrs.)

Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	CEMT2033	Applied Mathematics III	3	Natural Sciences
2.	CEME2023	Engineering Mechanics	3	Natural Sciences
З.	CEME2021	Engineering Mechanics Lab	1	Natural Sciences
4.	CE2162	Architecture & Town Planning	2	Interdisciplinary
5.	CEMG2013	Entrepreneurship	3	Interdisciplinary
6.	CE2172	Engineering Surveying II	2	Breadth
7.	CE2171	Engineering Surveying II Lab	1	Breadth
8.	CEMG2313	Construction Engineering &	3	Management
		Management		

Semester-IV (15 Cr. Hrs.)

Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	CEMT2043	Numerical Analysis	3	Natural Sciences
2.	CEHU2043	English II	3	Humanities
З.	CE2212	Strength of Materials I	2	CE Foundation
4.	CE2211	Strength of Materials I Lab	1	CE Foundation
5.	CE2181	Civil Engineering Drawing &	1	CE Foundation
		Estimation		
6.	CE2182	Civil Engineering Drawing &	2	CE Foundation
		Estimation Lab		
7.	CE2412	Fluid Mechanics I	2	CE Foundation
8.	CE2411	Fluid Mechanics I Lab	1	CE Foundation

Semester-V (17 Cr. Hrs.)

Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	CEMT3053	Probability and Statistics	3	Natural Sciences
2.	CE3233	Theory of Structures I	3	CE Foundation
З.	CE3231	Theory of Structures I Lab	1	CE Foundation
4.	CE3242	Steel Structures	2	Depth
5.	CE3241	Steel Structures Lab	1	Depth
6.	CE3223	Strength of Materials II	3	Depth
7.	CE3221	Strength of Materials II Lab	1	Depth
8.	CE3422	Fluid Mechanics II	2	Breadth
9.	CE3421	Fluid Mechanics II Lab	1	Breadth

Semester-VI (18 Cr. Hrs.)

Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	CE3252	Theory of Structures II	2	Depth
2.	CE3251	Theory of Structures II Lab	1	Depth
З.	CE3262	Plain and Reinforced Concrete I	2	Breadth
4.	CE3261	Plain and Reinforced Concrete	1	Breadth
		l Lab		
5.	CE3432	Engineering Hydrology	2	Management
6.	CE3431	Engineering Hydrology Lab	1	Management
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Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
7.	CE3512	Soil Mechanics	2	CE Foundation
8.	CE3511	Soil Mechanics Lab	1	CE Foundation
9.	CE3612	Environmental Engineering I	2	Breadth
10.	CE3611	Environmental Engineering I	1	Breadth
		Lab		
11.	CEHU3053	English III	3	Humanities

Semester-VII (17 Cr. Hrs.)

Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	CE4272	Plain and Reinforced	2	Depth
		Concrete II		
2.	CE4271	Plain and Reinforced	1	Depth
		Concrete II Lab		
З.	CE4442	Hydraulics Engineering	2	Depth
4.	CE4441	Hydraulics Engineering Lab	1	Depth
5.	CE4522	Geotechnical & Foundation	2	Depth
		Engineering		
6.	CE4521	Geotechnical & Foundation	1	Depth
		Engineering Lab		
7.	CE4532	Transportation Engineering I	2	Breadth
		Transportation Engineering I	1	Breadth
8.	CE4531	Lab		
9.	CE4622	Environmental Engineering II	2	Depth
10.	CE4621	Environmental Engineering II	1	Depth
		Lab		
11.	CE4912	Civil Engineering Project I	2	Design Project

Semester-VIII (57 Cr. Hrs.)

Sr. No	Course Code	Course Title	Cr. Hrs.	Туре
1.	CE4201	Design of Structures	1	Depth
2.	CE4211	Design of Structures Lab	1	Depth
З.	CE4283	Structural Engineering	3	Depth
4.	CE4452	Irrigation and Drainage	2	Depth
		Engineering		
5.	CE4451	Irrigation and Drainage	1	Depth
		Engineering Lab		
6.	CE4542	Transportation Engineering II	2	Depth
7.	CE4541	Transportation Engineering II	1	Depth
		Lab		
8.	CE4924	Civil Engineering Project II	4	Design Project

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M.Sc. Civil Engineering

Admission Requirements 8.1

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

- Minimum 2.00/4.00 CGPA or 50% marks (ii)
- (iii) Admission Test/HEC Approved Test

8.2 Degree Requirements

A student admitted in this programme 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
- Course work only (10 Courses) (ii)

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
	Total	30

Specialization Courses a)

i) Structural Engineering

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Advanced Structural Analysis	CED6113	3
2.	Structural Dynamics	CED6123	3
З.	Advanced Concrete Technology	CED6213	3
4.	Theory of Plates and Shells	CED6153	3
5.	Conceptual Design of Bridges	CED6253	3
6.	Design of Timber Structures	CED6263	3
7.	Advanced Reinforce Concrete Design	CED6223	3
8.	Finite Element Methods in Engineering	CED6133	3
9.	Earthquake Engineering	CED6143	3
10.	Pre-stressed Concrete	CED6233	3
11.	Steel Structures	CED6243	3
12	Design of Glass Structures	CED6273	3
13.	Design for Fire Resistance of Structures	CED6283	3

ii) Hydraulics & Irrigation Engineering

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Design of Hydraulic Structures	CED6513	3
2.	Irrigation Engineering and Practices	CED6623	3
З.	Advanced Fluvial Hydraulics	CED6533	3
4.	River Engineering and Flood Management	CED6553	3
5.	Computer Aided Design of Hydraulic Structures	CED6573	3
6.	Application of RS & GIS	CED6593	3
7.	Water Resources Engineering	CED6643	3
8.	Ground Water Engineering	CED6673	3
9.	Statistical Hydrology	CED6683	3
10.	Advanced Open Channel Hydraulics	CED6523	3
11.	Applied Hydrology	CED6613	3
12	Sediment Transport	CED6543	З
13.	Hydro Power Engineering	CED6563	З
14.	Drainage Engineering	CED6583	З
15.	Climate Change and Water Resources	CED6633	З
16.	Catchment Modeling	CED6653	3
17.	Hydrometeorology	CED6663	З
18.	Integrated Water Resource Management	CED6693	З
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iii) Geotechnical Engineering

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Advanced Soil Mechanics	CED6313	3
2.	Geotechnical Investigation	CED6323	3
З.	Geotechnical Engineering in Professional Practice	CED6353	3
4.	Advanced Foundation Engineering	CED6433	3
5.	Earth Retaining Structures	CED6443	3
6.	Foundation Engineering	CED6413	3
7.	Dam Engineering	CED6423	3
8.	Soil Improvement Techniques	CED6333	3
9.	Soil Dynamics	CED6343	3
10.	Soil Erosion & Watershed Management	CED6373	3
11.	Rock Engineering	CED6453	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

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Research Thesis	CE6916	6
2.	Thesis Continuation	CE6921	1

8.3 CGPA Requirement

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

8.4 Programme Duration

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



PhD Civil Engineering

9.1 Admission Requirements

(i) M.Sc. degree in a relevant discipline from a degree-awarding institute recognized by the Higher Education Commission (HEC) of Pakistan and, if applicable, Pakistan Engineering Council. The candidate will have to provide a PEC registration certificate

(ii) Minimum CGPA 3.00/4.00 (Semester System) or 60% marks (Annual System)

(iii) Admission Test/HEC Approved Test with minimum passing marks of 70%

(iv) Interview

(v) A PhD applicant having MSc from abroad shall submit an equivalence certificate from HEC indicating his or her academic eligibility for admission to the PhD program

(vi)An applicant who has already completed a part of PhD credit hours from another HEC recognized University may be eligible for admission subject to the following conditions:

1. No transfer of credit hours against research work shall be made

2. The University shall have an exclusive right to select or reject the request for credit hour transfer against coursework

9.2 Curriculum PhD Civil Engineering

A student enrolled in a PhD (Civil engineering) has to complete 06 courses in consultation with his supervisor and program coordinator. A semester-wise breakdown for completion of the PhD degree in 03 years is given below. A PhD candidate will be allowed to register for a maximum of three courses in one semester.

A PhD scholar will not be allowed to register in a course that he has studied during his master's degree. In case of those students who have previously completed a graduate degree in the same discipline (MS/MPhil or equivalent), the university shall notify a policy (which may vary by discipline) with objective criteria allowing such students to receive credit for prior coursework for not more than 50% of the total credit requirement of the program.

Semester-I (09 Cr. Hrs.)

Sr. No.	Courses	Cr. Hrs.
i)	Course - I	03
ii)	Course - II	03
iii)	Course - III	03

Semester-II (09 Cr. Hrs.)

Sr. No.	Courses	Cr. Hrs.
i)	Course - IV	03
ii)	Course - V	03
iii)	Course - VI	03

Semester-III (06 Cr. Hrs.)

Sr. No.	Courses
i)	Research Thesis
ii)	Comprehensive Exam
iii)	Synopsis defense

Semester-IV (06 Cr. Hrs.)

Sr. No.	Courses	Cr. Hrs.
i)	Research Thesis	24

Cr. Hrs.
06
00
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9.3 Courses for PhD in Civil Engineering

Sr. No.	Course Title	Code	Cr. Hrs.
1.	Structural Fire Engineering	CE7103	3
2.	Nano Secrets in Concrete	CE 7113	3
З.	Advanced Concrete Technology-II	CE 7123	3
4.	Performance Based Seismic Design	CE 8103	3
5.	Non-linear Structural Analysis	CE 8113	3
6.	Earthquake Seismology & earthquake Hazard	CE 8123	3
7.	Geotechnical Site investigation	CE 7203	3
8.	Mechanical Properties of soils	CE7213	3
9.	DAM & Rock Engineering	CE 7223	3
10.	Geotechnical Earthquake Engineering	CE8203	3
11.	Unsaturated Soil Mechanics in Engineering Pract	CE 8213	3
12.	Soil Strength and Slope Stability	CE 8223	3
13.	Hydrological System Modeling	CE 7303	3
14.	Urban Hydrology	CE 7313	3
15.	Hydrodynamics	CE 7323	3
16.	Computational Hydraulics	CE 8303	3
17.	Computational Fluid Dynamics	CE 8313	3
18.	Advanced Fluid Mechanics	CE 8323	3
19.	An Introduction to Intelligent Transportation Systems	CE 7403	3
20.	Urban Transportation Planning	CE 7413	3
21.	Logistics Systems	CE 7423	3
22.	Airport Planning and Design	CE 8403	3
23.	Public Transportation Systems	CE 8413	3
24.	Transportation Policy, Strategy, and Management	CE 8423	3
25.	Environmental Framework on Disaster	CE 7503	3
26.	Environmental Impact Assessment	CE 7513	3
27.	Waste Water Treatment and Design	CE 7523	3
28.	Air and Noise Pollution Control	CE 8503	3
29.	Environmental Chemistry and Microbiology	CE 8513	3
30.	Sustainable Urban Land use planning and Management	CE 8523	3
31.	Construction Project Scheduling	CE7603	3
32.	Project Cost Estimate	CE 7613	3
33.	Contract Management	CE 7623	3
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Sr. No.	Course Title	Code	Cr. Hrs.
34.	Sustainable Construction	CE 8603	3
35.	Building Information Modeling	CE 8613	3
36.	Lean Construction	CE 8623	3
37.	Advanced Topics in Civil Engineering	CE8903-8993	3
38.	Synopsis Evaluation	CE 7000	0
39.	Research Thesis	CE7916-7956	30
40.	Thesis Continuation	CE 7971	0
41.	Thesis Defense	CE 8000	0

9.4 Career prospects of the program

Jobs directly related to PhD Civil Engineering degree include:

•	Teaching Jobs	•	Research Jobs
•	Post-Doctorate	•	Consulting civil engineer
•	Contracting civil engineer	•	Client civil engineer
•	Structural engineer	•	Water engineer
•	Geotechnical Engineer		

9.5 Scope of the Program

During this time of science and technology, research and development requires highly qualified and trained engineers, especially in the field of Structural, Geotechnical and Water Resource Engineering. It is of paramount importance to gain professional expertise in the field with a special focus on emerging problems in the Construction Industry. The formulation of theories and proposing new and innovative ideas and solutions with the highest level of accuracy, originality and quality would be the hallmark of the scholars of this program.

9.6 Degree Requirements

A PhD Scholar Shall Be Required To Successfully Complete The Following Requirements:

- a. 18 Cr. Hrs. Course Work
- b. 30 Cr. Hrs. Research Work
- c. Comprehensive Examination
- d. Research Work Synopsis
- e. Dissertation Foreign Reviews

f. Publication Of At Least One Research Paper as First Author During His/Her Doctoral Studies In an HEC Approved W Category(Or As Per UCP Guidelines As Communicated Time To Time In Accordance With Hec Requirements) Research Journal for The Award Of Degree, And

g. Dissertation Defense

A student has to fulfil the residency requirement of at least 02 years at the university. The timeline of various milestones is defined in the table given below.

Activity	Preferred Time (by the end of)	Maximum Time (by the end of)
Course Work	2nd Semester	3rd Semester
Comprehensive Exam	3rd Semester	5th Semester
Synopsis Qualification	4th Semester	6th Semester
Thesis Submission	7th Semester	16th Semester

A PhD scholar shall cease to continue his/her studies if he/she fails to complete 18 Cr. Hrs. coursework within four regular semesters with at least 3.00/4.00 CGPA.

The PhD degree shall be awarded after a minimum of three (3) years and not more than eight (8) years after the enrollment of the student; provided that for students who are unable to complete the program within eight (8) years, the university may designate a competent authority to determine whether the delay was caused by circumstances beyond the student's control, and if so, grant an extension in such exceptional circumstances; however, in no event shall the PhD degree be awarded more than ten (10) years after the enrolment of the student in the program. The date of notification of the award of the PhD degree after the PhD defense shall be considered to be the date of the completion of PhD studies.





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