ELECTRICAL ENGINEERING MAJOR
CLASS OF 2026

ACADEMIC DOSSIER

OFFICE OF UNDERGRADUATE EDUCATION & ACCREDITATION

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1.0	New document	N/A	BoF	24/06/22

ELECTRICAL ENGINEERING

PROGRAM DESCRIPTION:

The two disciplines of Electrical Engineering and Computer Engineering have reshaped the way we live and think about our lives today, be it in the form of electronic devices, computers, communication networks in use, or new technologies in transport, agriculture, medicine, manufacturing, or commerce. Ideas from Electrical and Computer Engineering are even enhancing our understanding of other disciplines, such as Biology, Finance, and Economics. In upcoming decades, Electrical and Computer Engineers will play a pivotal role in tackling key challenges faced by our present society, such as the need for affordable and clean sources of energy and transport, advancements in health, resilient infrastructure, or imagining future of industry, to name a few. Keeping this state in view, the vision of the Electrical and Computer Engineering program is to shape electrical engineers and computer engineers who will assume a leadership role in pursuit of tackling these key challenges faced by our society.

Vision of Electrical and Computer Engineering program

Be an agent of positive change in society through excellence in locally contextualized and globally competitive liberal-arts and discipline-specific education and research, and imparting an understanding of contemporary issues and challenges facing the society.

PROGRAM EDUCATIONAL OBJECTIVES:

Electrical Engineering program at Habib University aims to produce competent electrical engineers who;

1. Exhibit broad-based technical excellence in their engineering practice and in other professional dealings.
2. Are aware of the impact of their work on society and environment.
3. Are capable of leading through a pluralistic approach.
4. Engage in the lifelong process of independent and reflective learning.

PROGRAM LEARNING OUTCOMES:

Upon graduation, students will have the following abilities:

1. Engineering Knowledge: an ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems;
2. Problem Analysis: an ability to identify, formulate, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering;
3. Design 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;
4. 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;
5. Modern tool usage: an ability to create, select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to complex engineering activities with an understanding of the limitations;

6. Contextual Awareness: 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;
7. 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;
8. Ethics: the ability to apply ethical principles and commit to professional ethics, responsibilities, and norms of engineering practice;
9. Collaboration: an ability to work effectively, as an individual or in a team, on multifaceted and/or multidisciplinary settings;
10. 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;
11. Project Management: an ability to demonstrate management skills as a member and/or leader in a team, to manage projects in a multidisciplinary environment;
12. Lifelong learning: an ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments.

MAPPING OF PLOS TO UNIVERSITY LEARNING GOALS:

PROGRAM LEARNING OUTCOMES - MAPPING

			University Learning Goals (ULG)								
			Know			*Act*			*Value*		
			Knowledge	***Interdisciplinary &***	***Context***	***Creativity &***	***Critical Inquiry***	***Communication &***	***Social Impact***	***Thought***	***Ethical & Cultural***
			Breadth & Depth	*Synthesis & Connections*	*Contextually Grounded*	*Imaginative & Interesting*	*Analysis & Critical Thought*	*Interaction & Teamwork*	*Service & Sustainability*	*Yohsin Values & Lifelong Learning*	*Personal & Professional Ethics*
			ULG 01	ULG 02	ULG 03	ULG 04	ULG 05	ULG 06	ULG 07	ULG 08	ULG 09
PLO	**Title**	**Program Learning Outcomes**	Demonstrate both a genuine breadth of knowledge through the Habib Liberal Core and a capable depth of knowledge throught command and their chosen major	Synthesize knowledge, methods and viewpoints from different disciplines to both make meaningful connections among and transcend them	Demonstrate their knowledge in a firm understanding of the historical, social, political, economic, religious, regional and global contexts in which they are located	Imagine, develop, and produce creative, original ideas, interpretations and works	Analyse and formulate relevant critical questions, and answer those questions in a substantive way supported by quantitative and qualitative evidence	Listen actively to comprehend the meaning of others and successfully express cogent meaning through capable oral, written, and artistic modes of communication. Effectively interact and collaborate with others	Recognize the reciprocity of knowledge and service, and benefit their community, society and the environment through socially responsible and sustainable engagement	Cultivate lifelong curiosity by engaging in inquiry and reflection to acquire and apply new knowledge	Develop and nurture their own beliefs, values, and sense of responsibility to reach informed conclusions, while considering, appreciating, and respecting the perspectives of others
1	Engineering Knowledge	An ability to apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems	S								
2	Problem Analysis	an ability to identify, formulate, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering	S	S			S				
3	Design 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		W	W	S			W		
4	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		S			S				
5	Modern Tool Usage	An ability to create, select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modelling, to complex engineering activities with an understanding of the limitations	S	S			S				
6	Contextual Awareness	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		S	S	W			W		
7	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							S		
8	Ethics	The ability to apply ethical principles and commit to professional ethics, responsibilities, and norms of engineering practice									S
9	Collaboration	An ability to work effectively, as an individual or in a team, on multifaceted and/or multidisciplinary settings						S			
10	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						S			
11	Project Management	An ability to demonstrate management skills as a member and/or leader in a team, to manage projects in a multidisciplinary environment									
12	Lifelong Learning	An ability to recognize importance of, and pursue lifelong learning in the broader context of innovation and technological developments								S	

Legend Competencies

S: Strongly - Program Learning Outcome strongly maps to the University Learning Goal

W: Weakly - Program Learning Outcome strongly maps to the University Learning Goal

REQUIRED COURSES:

EE 100/CE 100: Introduction to Electrical & Computer Engineering

Credit Hours: 0+2
Fulfils: EE foundation, CE foundation, ECE Minor foundation
Corequisite: CS 101

Through a series of projects, this course aims to expose the students, having little or no prior exposure, to the fascinating world of electrical and computer engineering. The course will allow the students to gain an appreciation for the history and possible futures of various disciplines within electrical and computer engineering. Students will spend most of their time in the lab working on these projects with classroom instruction for support. The course will introduce basic electrical concepts including charge, voltage, current, energy, power, resistance, capacitance, inductance, and Kirchoff's laws. Practical digital and analog electronic systems will also be introduced to illustrate advanced topics that are treated completely in subsequent electrical engineering courses.

EE/CE 112: Electric Circuits-I

Credit Hours: 2+0
Fulfils: EE Foundation, CE Foundation, ECE Minor Foundation

This course introduces basic DC and AC steady-state analysis for linear circuits. Topics discussed in this course include circuit elements, Ohm's law and Kirchhoff's laws, node and mesh analysis, energy storage elements, Thevenin and Norton theorems, Phasors and sinusoidal steady state analysis. Computer applications in circuit simulation and numerical solution is also discussed.

CS 101: Programming Fundamentals

Credit Hours: 2+1
Fulfills: Engineering Sciences and Computing
Pre-requisite: None

Motivates computer programming as a means to solve problems; introduces the basic components of problem solving: repetition, decision making, data storage and manipulation, input/output, modularity, top-down design; develops expertise in the corresponding constructs – variables, data types, iteration, conditionals, functions, file and console I/O, and recursion – in a high-level programming language.

MATH 101: Calculus I

Credit Hours: 4
Fulfils: This course meets requirements for EE, ECE and CS majors and Mathematics Minor for non-DSSE students.
Prerequisite: None

The course covers important pre-requisite content related to functions, their behavior, and multiple contexts for which they serve as an important modelling tool. This course fulfills a foundational mathematics course requirement for the Electrical Engineering, Computer Engineering and Computer Science majors. It is also a mandatory requirement for all non-DSSE students wishing to pursue a Mathematics Minor.

ENGR 291: Engineering Workshop

Credit Hours: 0+1
Fulfils: EE Design, CE Design ECE Minor Foundation

This course aims to introduce students to hands-on engineering skills, necessary for creating their own prototypes. Topics covered in this course include introduction to engineering design process, shop safety, engineering drawing, solid modeling (CAD), 3D printing, effective use of basic hand tools such as saws and files, machining (Lathe, Milling, Drill press), CNC machining, soldering techniques, and PCB design

and printing. The course work emphasizes practical skills through lab activities and project. Students will be required to work with different materials including metal, wood, and plastic.

PLAY 113: Design Your Habib Experience

Credit Hours: 0+1
Fulfils: EE Design, CE Design ECE Minor Foundation
Prerequisite: None

This course will take you through the basics of Human-Centered Design: an approach to problem-solving that involves empathizing with people; defining problems; generating ideas; prototyping solutions; and testing to learn what works and what doesn't. The first twelve weeks of the course will take students through the design process, practically applying key methods and mindsets to tackle problems around us at Habib. For example, this could be redesigning the university food experience, or designing a new student governance model. In the last three weeks of the course, students will apply their skills and knowledge to a more personal challenge: designing their own Habib experience.

CS 102: Data Structures and Algorithms

Credit Hours: 3+1
Prerequisite: CS 101
Fulfills: Engineering Sciences and Computing

Motivates the design of algorithms by exploring various algorithms for a single task: linear search and binary search, bubble sort, insertion sort, selection sort, merge sort, quick sort; introduces techniques to reason about and compare algorithms: asymptotic analysis and notation, Master theorem; introduces frequently used data structures: list, tree, graph, stack, queue; discusses and analyzes basic operations on the data structures: infix, postfix, and prefix traversal, breadth-first and depth-first search, computation of graph properties.

MATH 102: Calculus II

Credit Hours: 3
Fulfils: This course meets requirements for advanced courses in EE, ECE and CS majors and Mathematics & Physics Minor for non-DSSE students.
Prerequisite: MATH 101

Calculus is a very important part of Applied Mathematics which in turn serves as an important tool in Science and Engineering. In Calculus I you studied the fundamental concepts of function and the techniques of differentiation and integration. Calculus II builds upon the concepts of calculus learned in the previous course and extends them to other areas of Applied Mathematics such as multivariable functions and vectors.

CE 222/CS 130/EE 172: Digital Logic and Design

Credit Hours: 3+1
Fulfils: EE Core, CE Core, ECE Minor Foundation

Introduction to the design of digital hardware, realization of computation with logic gates; Boolean algebra, design of combinational logic circuits, and analysis and design of clocked sequential logic circuits, circuits for arithmetic operations; introduction to hardware description language and its application to logic design.

EE 213: Electric Circuits-II

Credit Hours: 3+1
Fulfils: EE Foundation, ECE Minor Concentration Foundation
Prerequisite: CE/EE 112/112

This course is a continuation of EE 111, Electric Circuit Analysis. The course discusses DC and AC transient analysis, sinusoidal steady state analysis of RC, RL, and RLC circuits, AC circuit power analysis,

polyphase circuits and magnetically coupled circuits. The course then introduces the students to s-domain analysis techniques and ends with a discussion of frequency responses.

MATH 205: Linear Algebra

Credit Hours: 3
Fulfils: Mandatory Math requirement for all DSSE students
Prerequisite: MATH 202

Topics covered: A brief revision of vector algebra including lines and planes in 3D and matrices, Determinants, Symmetric matrices, and quadratic forms; Elementary row and column operations of a matrix; Systems of linear equations and their solutions, existence, and uniqueness of solutions; Vector spaces; Inner products and ortho-normalisation; Orthogonal transformations and rotations; Linear transformations, orthogonality, QR factorization, Hermitian and Unitary transformations; Least squares analysis and approximations; Singular value decomposition; Direct sum decomposition; and Caley-Hamilton Theorem.

MATH 202: Engineering Mathematics

Credit Hours: 3+0
Fulfils: Mandatory Math requirement for all DSSE students
Prerequisite: MATH 102

Topics include: Vector Calculus (vector functions, line and surface integrals). Elementary methods for solving first order ODEs (direct integration and substitution) with geometric interpretation and classification, separable ODEs, method of integrating factors. Vector algebra (including matrix algebra, eigenvalues and eigenvectors, quadric surfaces). Dynamical systems (linear systems of ODEs, stability and phase portraits of dynamical systems). Second, order ODEs – elementary methods including their classification, reduction of order techniques, linear second order ODEs with constant coefficients, and finding particular solutions. Orthogonal functions and Fourier series solutions (generalized and trigonometric methods), convergence in the mean and pointwise convergence, odd and even expansions, half-range expansions. Partial differential equations (PDEs) (wave, heat and Laplace equations), solutions using Fourier series and Laplace transforms, and Schrodinger equation.

EE 211/CE 211: Basic Electronics

Credit Hours: 3+1
Fulfils: EE Core, CE Core, ECE Minor Foundation
Prerequisite: EE/CE 112

The course aims to introduce students to semiconductor devices, with emphasis on application of these devices in realizing analog and digital electronic circuits. The course starts with an introduction to semiconductors, energy bands, valence bonds, doping, n-type and p-type semi-conductors. The electronic devices, such as PN junction diode, bipolar junction transistor (BJT) and Metal-oxide semiconductor field-effect transistor (MOSFET), along with their applications are discussed in detail. Biasing circuits, single transistor amplifiers and their frequency are also discussed. Circuit simulations using PSpice (OrCAD) forms an important bridge between the theory discussed in class and lab experiments.

EE 354/CE 361/MATH 310: Introduction to Probability and Statistics

Credit Hours: 3+0
Fulfils: EE Foundation, CE Foundation
Prerequisite: MATH 102

Set theory and counting principles, axiomatic definition of probability, independence and conditional probability, Bayes' theorem; random variables (RVs) and their cumulative distribution function, probability mass functions, probability density functions and moments; joint RVs; limits theorems; statistics; applications.

EE 113L: Electric Circuits-II Lab

Credit Hours: 0+1
Fulfils: EE Foundation, CE Foundation, ECE Minor Foundation

CS 224: Object Oriented Programming

Credit Hours: 3+1
Prerequisite: CS 102
Fulfills: Engineering Sciences and Computing

Introduces object oriented and related memory concepts; motivates C++ as the language of choice; topics include: pointers and structs, objects, heap allocation, data encapsulation, classes, namespaces, constructors and destructors, virtual functions and destructors, operator overloading and standard input/output, inheritance and polymorphism, templates, standard library containers, and software design using UML 2.0.

PHY xxx: Physics of Semi-conductors

Credit Hours: 3+0
Fulfills: Circuits and Electronics

This course is currently under development.

EE 241: Electromagnetic Theory

Credit Hours: 3+0
Fulfils: EE Core, ECE Minor Elective

The study of electrostatic and magneto-static fields in free and material spaces; solving boundary-value problems; extension of static fields to time-varying fields and electromagnetic waves; Maxwell's equations; propagation of electromagnetic waves through different types of media (unbounded media and guided structures) and their behavior at the interfaces.

EE 252/CE 251: Signals and Systems

Credit Hours: 3+1
Fulfils: EE Foundation, CE Core, ECE Minor Foundation
Prerequisite: MATH 101

The topics covered in this course include types of signals; unit impulse and unit step functions; linear time invariant (LTI) systems and their properties; convolution sum and convolution integral; Fourier series, Fourier, Laplace and Z transforms; analysis and characterization of LTI systems using various transforms, Sampling.

EE 371/CE 321: Computer Architecture

Credit Hours: 3+0
Fulfils: EE Core, CE Core, ECE Minor Elective
Prerequisite: CE/CS/EE 222/130/172

Studies the architecture of processors that enable general purpose computing and develops hands-on expertise in developing complex logical components. Topics include instruction set architecture, addressing modes, processor design and computer arithmetic, pipelining, memory systems, fetch execution cycle, processor implementation on FPGA using Verilog HDL.

CE 333/EE 376: Microcontrollers and Interfacing

Credit Hours: 0+1
Fulfils: EE Core, CE Core, ECE Minor Elective
Prerequisite: CE 222/CS 130/EE 172

Microcontrollers play a central role in modern life, controlling everything from the engine of a car, to domestic and office machinery. Microcontroller fundamentals including architecture, assembly language programming, and interfacing. Applications of industry-standard microcontrollers in embedded systems.

Employs software design tools, simulators, and hardware trainers. Will focus on interfacing the ARM RISC processor to motors, actuators and sensors.

EE 331: Electrical Machines

Credit Hours: 3+1
Fulfils: EE Core, ECE Minor Elective
Prerequisite: EE 212, EE 241

This is the first course on DC and AC electromechanical systems. Specific topics include single-phase and three-phase transformers, general structure and physical principles underlying electric drive systems, brushless, stepper and switched reluctance DC motors, DC generators, Induction and Synchronous AC motors and generators, torque-speed characteristics of motor drives. Mathematical modeling and speed control of electrical machines will also be discussed.

EE 361/CE 353: Principles of Feedback Control

Credit Hours: 3+1
Fulfils: EE Core, CE Elective ECE Minor Elective
Prerequisite: CE/EE 251/252, MATH 202

Topics include: Models of dynamic systems, linear time-invariant (LTI) and transfer function models; impulse, step, transient and steady-state response; root locus technique, Bodé plots, Nyquist criterion; gain and phase margins, Nichols charts, lead, lag compensation; state-space techniques; simulation and controller design using MATLAB and Simulink.

EE 322: Analog and Digital Communication

Credit Hours: 3+1
Fulfils: EE Core, ECE Minor Elective
Prerequisite: EE 252/CE 251

Introduction to fundamental principles underlying the analysis, design and optimization of analog and digital communication systems; modulation techniques for analog and digital communication; effects of interference and noise and their suppression.

EE/CE 301: Electrical & Computer Engineering Seminar

Credit Hours: 1+0
Fulfils: EE Core, CE Core

Through a series of weekly seminars by researchers and engineers working in the domain of Electrical Engineering, this course achieves the following objectives:
Exposure to various sub-disciplines in Electrical Engineering, their corresponding electives at HU, and that state of research in that sub-discipline;
Strengthen the commitment to professional and ethical practice of engineering;
Awareness of some theoretical ideas in Electrical Engineering, not covered in other courses.

EE/CE 391: Engineering Design and Innovation Lab

Credit Hours: 0+2
Fulfils: EE Design, CE Design

This course aims to cultivate skills needed to produce great designs, be a more effective engineer, and communicate with high emotional and intellectual impact. This is accomplished by working on projects centered around a locally contextualized wicked problem and students are expected to develop a solution to their identified problem by the end of semester. During the course of the semester, students will study and apply techniques suited for various steps of the design process. Students will come to appreciate that a design problem involves multiple stakeholders, come to terms with the ambiguity that shows up in design problems, make decisions in presence of multiple conflicting objectives and constraints, handle

uncertainty, think as part of a team, learn how to manage the progress of their project, and communicate their design effectively.

EE 335: Power Generation, Transmission, and Distribution

Credit Hours: 3+1
Fulfils: EE Core, ECE Minor Elective
Prerequisite: CE 211/EE 213, EE 212

The development of electrical power systems has immensely contributed to the technological advances of the humankind over the past century. Electrical power provides clean and convenient energy to the modern society, which is necessary for the realization of the luxuries we are enjoying in this world today. In summary, the modern world and society does not exist without the availability of electricity. The purpose of this course is to provide the students with a complete flavor of the full-spectrum of electric power generation, transmission, and distribution systems.

EE/CE 491: Capstone Project I

Credit Hours: 0+3
Fulfils: Design in Engineering, Design Project
Prerequisite: ENGR 291, EE 375, EE 391

By the senior year, students have acquired sufficient breadth in Electrical Engineering (EE) and are on their way to acquire depth in one or more areas of specialization through technical electives. Intellectual maturity also requires that students understand their education in the broader context of the world and are prepared to make committed choices as participants of this complex world. The capstone design project, offered as a two semesters sequence, provides students with an opportunity to reflect on their entire educational experience, integrate the knowledge and skills acquired in earlier years, form connections within and across disciplines, and synthesize a solution to a problem connecting them to the broader issues of their discipline as well as the world they're about to enter.

EE/CE 492: Capstone Project II

Credit Hours: 0+3
Fulfils: Design in Engineering, Design Project
Prerequisite: EE/CE 491

This year-long sequence represents the culmination of study towards the BS degree. Students work individually or in small teams on a project in which they utilize the knowledge acquired during the first three years of education. Each project is closely supervised by a faculty member and each team produces a comprehensive report at the end of the project.

Professional Practices Category Courses:

The students are required to enroll in either one of the following courses falling under the Professional Practices category:

MGMT 301: Technology Management and Entrepreneurship

Course Prerequisites: None
Credit hours: 2+0

Topics include: managing technological transitions, intellectual property, creating and managing an innovative organization, managing research and development, organizational learning, economist and sociologist views of entrepreneurship, the process and management of entrepreneurship, the importance of innovation, teamwork, financial and marketing aspects, product quality; study will be supplemented with case studies.

MGMT 304: Fundamentals of Intellectual Property

Course Prerequisites: None

Credit hours: 3+0

A primary purpose of this course is to raise awareness of Intellectual Property (IP) amongst students and to introduce the topic of IP, associated law, and some of its primary branches, to a non-legal (e.g. STEM, social sciences, design, liberal arts) audience so that they may effectively navigate through the landscape of various intellectual property regimes and related family of (legal) rights (IPR). Whilst these rights are rooted in law, intellectual property education has branches which touch many areas of academic research and commercial activity, including: economics, finance, taxation, human rights, ethics, education, governance and management. Studying intellectual property in a non-law curriculum can be seen as an 'opportunity' to engage with a vital topic that links commercial, legal and technical disciplines. Another important purpose of this course is to introduce students to the increasingly important area of IP management (and IP strategy). IP and intangible assets are driven by investments in R&D, advertising and marketing, education and training, management information systems, organizational structure, and so on. The development of such assets can involve invention or some other creative step, as well as innovation. The investments and the activities involved are all inherently risky. Thus, understanding the management of IP and intangible assets requires inputs from a variety of disciplines, including economics, law, accounting and finance, management, and so on. An exposure to some key tactics on the strategic management of IP supplemented with relevant IP management case studies can be of immense value in todays and tomorrow's expanding ecosystem.

MGMT 320: Principles of Management

Course Prerequisites: None
Credit Hours: 3+0

The course on Principles of Management for Tech Professionals introduces management as a discipline and process to tech professionals. This course includes evolution and scope of management, decision-making, planning, strategy, organizing, staffing, leading, control, change, and the importance of management in the global environment and ethical considerations of management decisions. Hence, the course provides a framework that will enhance a person's effectiveness in the business.

MGMT 321: Engineering Project Management

Course Prerequisites: None
Credit Hours: 3+0

Through using textbook, discussions, assignments and real-world examples, the engineering professionals will learn how to identify, define, plan, execute, monitor, control, and close projects. They will build project components, organize work efficiently, effectively and help them to control changes. The students will use tools to build works schedules, allocate resources and manage cost of any project. This will help them to get a hands-on training of using project management tools for the smooth flow of various stages of project that is the need of time and most demanded skill by the employers all around the world.

MGMT 322: Operations Management

Course Prerequisites: None
Credit Hours: 3+0

The course aims to provide an understanding to identify, define, plan, execute, monitor, control, optimize and improve operations and processes in both manufacturing and service industries. For many different types of operations either in the tangible goods industry or the intangible service industry, this course aims to familiarize students with the major operational issues that challenge entrepreneurs and managers and provide them with the basic language, concepts, insights, and analytical tools to deal with these issues.

MGMT 323: Supply Chain Management

Course Prerequisites: None
Credit Hours: 3+0

The course aims to provide an understanding of fundamental concepts of supply chain management. All functional areas of supply chain management are explored in an integrated view of procurement, manufacturing and operations management, transportation and logistics, inventory and warehousing,

demand planning, scheduling, network design, collaboration, and performance measurement. Topics may also cover supply chain financial metrics, strategy, and risk management for demand-driven value networks.

ECON 302: Engineering Economics
Credit Hours: 3+0
Fulfils: Professional Practice

Topics include: Application of economic principles to engineering solutions, time value of money, cash flow analysis, quantization of profitability, methods of evaluating investments, comparison of alternative investments, inflation, depreciation, resource depletion, economic analysis of projects, economic management of engineering projects.

LIST OF ELECTIVES:

Below is the proposed list of elective courses offered by the EE Major. These elective courses may be subject to change.

Fall 2022

EE 355/CE 362/MATH 322 – Statistics and Inferencing

EE 424 – Data Communication and Networking

EE 424L – Data Communication and Networking Lab

EE 433 – Power Electronics System Design

EE 451 – Digital Image Processing

EE 451L – Digital Image Processing Lab

EE 468 – Mobile Robotics

MGMT 320 – Principles of Management

MGMT 323 – Supply Chain Management

GRADUATING REQUIREMENTS:

1. Minimum credit hours: 130 credit hours.
2. 33 required courses as specified in the grid for the respective class.
3. One Natural Science course of at least 3 credit hours.
4. Two Professional Practice courses, totaling to at least 5 credit hours.
5. One Interdisciplinary Engineering course of at least 3 credit hours.
6. One Philosophy elective of at least 3 credit hours.
7. Five EE elective courses and at least three selected electives should have accompanying labs. All electives are to be taken with their accompanying labs.

4-YEAR GRID:

EE Curriculum for Class of 2026 v9.8 (Fall 22 - Spring 26)

Graduating Requirements - 44 Courses & minimum Credit Hours = 134

Year	Semester & CH	University Core					Science & Math					Computing					Engineering				
		CC	Code	Course Title	Th	Lb	CC	Code	Course Title	Th	Lb	CC	Code	Course Title	Th	Lb	CC	Code	Course Title	Th	Lb
Year 1 - 35 Hrs	**SEM-1** Fall 22 CH - 16	1	CORE 101	Rhetoric and Communication	4	0	2	MATH 101	Calculus I	4	0	3	CS 101	Programming Fundamentals	2	1	4	EE 100	Introduction to Electrical and Computer Engineering	0	2
		1. Language & Expression -1of2										*2. Formal Reasoning - 1of1*					5	EE 112	Electric Circuits -I	2	0
																	6	PLAY 113	Design your HU experience	0	1
	SEM-2 Spring 23 CH - 19	1	CORE 102	What is Modernity?	4	0	2	MATH 102	Calculus II	3	0	3	CS 102	Data Structures and Algorithms	3	1	4	EE 172	Digital Logic Design	3	1
		3. Historical & Social Thought - 1of2															5	EE 213	Electric Circuits -II	3	0
																	6	ENGR 291	Engineering Workshop and Design	0	1
Year 2 - 35 Hrs	**SEM-3** Fall 23 CH - 18	1	CORE 201	Pakistan and Modern South Asia	4	0	2	MATH 202	Engineering Math	3	0	4	CS 224	Object Oriented Programming	3	1	5	EE 113L	Electric Circuits -II Lab	0	1
		4. Historical & Social Thought - 2of2					3	PHY XXX	Physics of Semiconductors	3	0						6	EE 354	Probability and Statistics	3	0
																		6. Quantitative Reasoning - 1of1			
	SEM-4 Spring 24 CH - 17	1	CORE 200	Scientific Method	3	0	2	MATH 205	Linear Algebra	3	0						3	EE 211	Basic Electronics	3	1
		5. NS Method & Analysis - 1of1															4	EE 252	Signals and Systems	3	1
																	5	EE 371	Computer Architecture	3	0
Year 3 - 33-36 Hrs	**SEM-5** Fall 24 CH - 16-18	1	CORE 121	Jehan-e-Urdu	3	0						2	XX xxx	Professional Practice Elective I	2-3	0	3	EE 241	Electromagnetic Theory	3	0
		7. Language & Expression - 2of2															4	EE 322	Analog and Digital Communication	3	1
																	5	EE 376	Microcontrollers and Interfacing	0	1
																	6	EE xxx	EE Elective I*	3	0-1
	SEM-6 Spring 25 CH - 17-18	1	CORE 202	Hikmah I	3	0											2	EE 301	ECE Seminar	1	0
		8. Philosophical Thought - 1of2															3	EE 331	Electrical Machines	3	1
																	4	EE 361	Feedback Control Systems	3	1
																	5	EE 391	Engineering Design and Innovation	0	2
																		9. Creative Practice - 1of1			
																	6	EE xxx	EE Elective II*	3	0-1
Year 4 - 28 - 31 Hrs	**SEM-7** Fall 25 CH - 16-18	1	XX xxx	Philosophy Elective	3	0											2	EE 335	Power Generation, Transmission and Distribution	3	1
		10. Philosophical Thought - 2of2															3	EE xxx	EE Elective III*	3	0-1
																	4	EE xxx	EE Elective IV*	3	0-1
																	5	EE 491	Capstone Design Project -I	0	3
	SEM-8 Spring 26 CH - 12-13											1	XX xxx	Professional Practice Elective II	3	0	2	EE xxx	Interdiscplinary Engineering Elective (IDEE)	3	0
																	3	EE xxx	EE Elective V*	3	0-1
																	4	EE 492	Capstone Design Project -II	0	3

Total Credit Hours	134	137
Non Engineering Credits	46	47
Engineering Credits	88	90
Worst-case ratio of non-engineering credits		35%

Legend

Th	Theory
Lb	Lab
CH	Credit Hours
CC	Course Count
SEM	Semester

Legend

- University Core
- Engineering Sciences and Computing
- Circuits and Electronics
- Digital Systems
- Systems Theory
- Power Systems
- Design

* Electives can be with or without labs - however, if the elective is offered with labs than those labs would be mandatory for graduation.