

## Department of Electrical Engineering

### BS Computer Systems Roadmap Fall 2025

#### FIRST YEAR

Fall Semester (1 <sup>st</sup> )				Spring Semester (2 <sup>nd</sup> )			
Code	Course Title	CH	Pre-req	Code	Course Title	CH	Pre-req
GEN-111	Applications of ICT	2		MTH-121	Linear Algebra	3	
GEN-111L	Applications of ICT Lab	1		CSY-121	Programming Fundamentals	3	
GEN-112	Conversational and Listening Skills / Functional English	3		CSY-121L	Programming Fundamentals Lab	1	
GEN-113	Calculus and Analytical Geometry	3		CSY-122	Basic Electronics	2	
GEN-114	Applied Physics	2		CSY-122L	Basic Electronics Lab	1	
GEN-114L	Applied Physics Lab	1		GEN-121	Ideology and Constitution of Pakistan	2	
CSY-111	Circuit Analysis	3		GEN-122	Islamic Studies/ Ethics	2	
CSY-111L	Circuit Analysis Lab	1		GEN-123	Discrete Structures	3	
Total		16		Total		17	

#### SECOND YEAR

Semester (3 <sup>rd</sup> )				Spring Semester (4 <sup>th</sup> )			
Code	Course Title	CH	Pre-req	Code	Course Title	CH	Pre-req
CSY-231	Digital Logic Design	3		CSY-241	Data Structures and Algorithms	3	
CSY-231L	Digital Logic Design Lab	1		CSY-241L	Data Structures and Algorithms (Lab)	1	
CSY-232	Object Oriented Programming	3		CSY-242	Signals and Systems	3	
CSY-232L	Object Oriented Programming (Lab)	1		CSY-242L	Signals and Systems (Lab)	1	
CSY-233	Database Systems	3		CSY-243	Computer Organization and Architecture	3	
CSY-233L	Database Systems (Lab)	1		CSY-243L	Computer Organization and Architecture (Lab)	1	
GEN-231	Writing and Reading for Impact / Expository Writing	3		MTH-361	Probability and Statistics	3	
GEN-232	Arts and Humanities Elective	2		GEN-241	Civics and Community Engagement	2	
GEN-233	Fehm-e-Quran - I	1*		GEN-242	Fehm e Quran - II	1*	
Total		18		Total		18	

#### THIRD YEAR

Semester (5 <sup>th</sup> )				Spring Semester (6 <sup>th</sup> )			
Code	Course Title	CH	Pre-req	Code	Course Title	CH	Pre-req
CSY-351	Microprocessors and Interfacing	3		CSY-361	Data Communication and Networking	3	
CSY-351	Microprocessors and Interfacing (Lab)	1		CSY-361L	Data Communication and Networking (Lab)	1	
CSY-352	Applied Machine Learning	3		CSY-362	Digital System Design	3	
CSY-352	Applied Machine Learning (Lab)	1		CSY-362L	Digital System Design (Lab)	1	
CSY-353	Operating Systems	3		CSY-363	Embedded Systems	3	
CSY-353	Operating Systems (Lab)	1		CSY-363L	Embedded Systems Lab	1	
CSY-354	Software Design and Development	3		CSY-364	IDE-II	3	
CSY-355	IDE-I	3		CSY-365	CSDE-I	3	
Total		18		Total		18	

#### FOURTH YEAR

Semester (7 <sup>th</sup> )				Spring Semester (8 <sup>th</sup> )			
Code	Course Title	CH	Pre-req	Code	Course Title	CH	Pre-req
GEN-471	Entrepreneurship	2		GEN-481	Social Sciences Elective	2	
GEN-472	Pakistan Studies	2		CSY-481	CSDE-III	3	
CSY-471	Internet of Things (IoT)	3		CSY-481L	CSDE-III Lab	1	
CSYL-471	Internet of Things (IoT) Lab	1		CSY-482	CSDE-IV	3	
CSY-472	CSDE-II	3		CSY-482L	CSDE-IV Lab	1	
CSY-472L	CSDE-II Lab	1		CSY-483	Final Year Design Project II	4	
CSY-473	Artificial Intelligence Systems	3					
CSY-474	Final Year Design Project I	2					
Total		17		Total		14	

Total Credit Hours: 136

## **Mandatory and Qualifying**

\*6-8 weeks industrial training (Non-Credit)

\*Community Service (Non-Credit)

## **List of Arts and Humanities Electives (2+0)**

1. GEN-XXX Professional Ethics (Professional Practices)
2. GEN-XXX Foreign Language

## **List of Social Science Electives (2+0)**

1. GEN-XXX Psychology of Mind and Behaviour
2. GEN-XXX Digital Marketing
3. GEN-XXX Introduction to Management

## **List of Electives for Computer Systems Program**

### **Computer Systems Domain Electives (CSDE)**

#### **Embedded Systems**

CSY-XXX Advanced Computer Architecture (3+0)  
CSY-XXX Real Time Operating Systems (RTOS) (3+1)  
CSY-XXX System on Chip (SoC) Design (3+1)  
CSY-XXX FPGA-Based System Design (3+1)  
CSY-XXX VLSI System Design (3+1)  
CSY-XXX Digital Signal Processing (3+1)  
CSY-XXX Digital Image Processing (3+1)  
CSY-XXX Digital Control Systems (3+1)

#### **Software Systems**

CSY-XXX Software Project Management (3+0)  
CSY-XXX Web Application Engineering (3+1)  
CSY-XXX Mobile Software Development (3+1)  
CSY-XXX Cloud Software Systems (3+1)  
CSY-XXX Information Security (3+1)  
CSY-XXX Human-Computer Interaction (3+1)  
CSY-XXX DevOps & Software Automation (3+1)  
CSY-XXX Secure Software Systems (3+1)

## **Data Engineering**

CSY-XXX Data Science & Business Analytics (3+0)  
CSY-XXX Big Data Systems (3+1)  
CSY-XXX Data Warehousing & ETL (3+1)  
CSY-XXX Cloud Data Engineering (3+1)  
CSY-XXX Data Pipeline Orchestration (3+1)  
CSY-XXX Data Mining and Visualization (3+1)  
CSY-XXX Data Governance & Quality (3+1)  
CSY-XXX Computational Data Management (3+1)

## **Quantum Computing**

CSY-XXX Applications of Quantum Computing (3+0)  
CSY-XXX Quantum Programming (3+1)  
CSY-XXX Quantum Algorithms (3+1)  
CSY-XXX Quantum Hardware and Architectures (3+1)  
CSY-XXX Quantum Information Theory (3+1)

CSY-XXX Quantum Error Correction (3+1)  
CSY-XXX Quantum Cryptography (3+1)  
CSY-XXX Quantum Machine Learning (3+1)

**Inter Disciplinary Electives (IDE)**

CSY-XXX Introduction to Data Engineering (3+0)  
CSY-XXX Introduction to Quantum Computing (3+0)  
CSY-XXX Introduction to Robotics (3+0)  
CSY-XXX Parallel and Distributing Computing (3+0)