|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Department of Electrical Engineering** | | | | | | | |
| **BS Computer Engineering Roadmap Fall-2024** | | | | | | | |
|  | | | | | | | |
| **FIRST YEAR** | | | | | | | |
| **Fall Semester (1st)** | | | | **Spring Semester (2nd)** | | | |
| **Code** | **Course Title** | **CH** | **Pre-req** | **Code** | **Course Title** | **CH** | **Pre-req** |
| EE125 | Applications of ICT | 2 |  | MA210 | Linear Algebra | 3 |  |
| EE125L | Applications of ICT Lab | 1 |  | CS143 | Programming Fundamentals | 3 |  |
| EN104 | Functional English | 3 |  | CS143L | Programming Fundamentals Lab | 1 |  |
| MA112 | Calculus and Analytical Geometry | 3 |  | CPE122 | Electronic Devices and Circuits | 3 |  |
| EE110 | Circuit Analysis | 3 |  | CPE122L | Electronic Devices and Circuits Lab | 1 |  |
| EE110L | Circuit Analysis Lab | 1 |  | SS171 | Ideology and Constitution of Pakistan | 2 |  |
| NS124 | Applied Physics | 2 |  | HM150 | Islamic Studies/ Ethics | 2 |  |
| NS124L | Applied Physics Lab | 1 |  | CPE123 | Discrete Structures | 3 |  |
|  |  |  |  |  |  |  |  |
|  | |  |  |  | |  | |
| **Total** | | 16 |  | **Total** | | 18 | |
|  |  |  |  |  |  |  |  |
| **SECOND YEAR** | | | | | | | |
| **Semester (3rd)** | |  |  | **Spring Semester (4th)** | | | |
| **Code** | **Course Title** | **CH** | **Pre-req** | **Code** | **Course Title** | **CH** | **Pre-req** |
| EE220 | Digital Logic Design | 3 |  | CPE241 | Data Structures and Algorithms | 3 |  |
| EE220L | Digital Logic Design Lab | 1 |  | CPE241L | Data Structures and Algorithms (Lab) | 1 |  |
| CS151 | Object Oriented Programming | 3 |  | EE315 | Signals and Systems | 3 |  |
| CS151L | Object Oriented Programming (Lab) | 1 |  | EE315L | Signals and Systems (Lab) | 1 |  |
| EN126 | Expository Writing | 3 |  | EE227 | Computer Organization and Architecture | 3 |  |
| ENXXX | Arts and Humanities Elective | 2 |  | EE227L | Computer Organization and Architecture (Lab) | 1 |  |
| MA223 | Complex Variables and Transforms | 3 |  | MA230 | Differential Equations | 3 |  |
| CPE233 | Occupational Health and Safety | 1 |  | SD104 | Civics and Community Engagement | 2 |  |
|  |  |  |  |  |  |  |  |
|  | |  |  |  | |  | |
| **Total** | | 17 |  | **Total** | | 17 | |
|  |  |  |  |  |  |  |  |
| **THIRD YEAR** | | | | | | | |
| **Semester (5th)** | |  |  | **Spring Semester (6th)** | | | |
| **Code** | **Course Title** | **CH** | **Pre-req** | **Code** | **Course Title** | **CH** | **Pre-req** |
| CPE351 | Microprocessors and Interfacing | 3 |  | CPE361 | Data Communication and Computer Networks | 3 |  |
| CPE351L | Microprocessors and Interfacing  (Lab) | 1 |  | CPE361L | Data Communication and Computer Networks (Lab) | 1 |  |
| CPE-352 | Digital Signal Processing | 3 |  | EE320 | Digital System Design | 3 |  |
| CPE-352L | Digital Signal Processing (Lab) | 1 |  | EE320L | Digital System Design (Lab) | 1 |  |
| CPE353 | Database Management System | 3 |  | CPE-363 | Software Engineering | 3 |  |
| CPE353L | Database Management System (Lab) | 1 |  | EE306 | Probability and Statistics Engineers | 3 |  |
| EE325 | Operating Systems | 3 |  | CPE-XXX | CEDE-I | 3 |  |
| EE325L | Operating Systems (Lab) | 1 |  | CPE-XXXL | CEDE-I Lab | 1 |  |
|  |  |  |  |  |  |  |  |
|  | |  |  |  | |  | |
| **Total** | | 16 |  | **Total** | | 18 | |
|  |  |  |  |  |  |  |  |
| **FOURTH YEAR** | | | | | | | |
| **Semester (7th)** | |  |  | **Spring Semester (8th)** | | | |
| **Code** | **Course Title** | **CH** | **Pre-req** | **Code** | **Course Title** | **CH** | **Pre-req** |
| SS306 | Entrepreneurship | 3 |  | SSXXX | Social Sciences Elective | 2 |  |
| EE459 | Wireless and Mobile Networks | 3 |  | CPEXXX | CEDE-IV | 3 |  |
| CPE-XXX | CEDE-II | 3 |  | CPEXXXL | CEDE-IV Lab | 1 |  |
| CPE-XXXL | CEDE-II Lab | 1 |  | CPEXXX | MDEE-I | 3 |  |
| CPE-XXX | CEDE-III | 3 |  | CPEXXX | MDEE-II | 3 |  |
| CPE471 | Final Year Design Project I | 3 |  | CPE481 | Final Year Design Project II | 3 |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  | |  |  |  | |  | |
| **Total** | | 16 |  | **Total** | | 15 | |
| **Total Credit Hours: 133** | | | | | | | |

**Mandatory and Qualifying**

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

**\***Community Service (Non-Credit)

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

1. Communication and Presentation skills (EN130)
2. Professional Ethics (ET216)
3. Foreign Language (SS250)

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

1. Critical Thinking (SS201)
2. Engineering Economics (MS224)
3. Engineering Management (MS323)

**List of Electives for Computer Engineering Program**

**Computer Engineering Depth Electives (CEDE)**

Cloud and Distributed Computing (3+1) (CPE401, CPE401L)

Internet of Things (3+1) (EE453, EE453L)

Embedded System (3+1) (EE329, EE329L)

Artificial Intelligence (3+1) (EE408, EE408)

Machine Learning (3+1) (CPE405, CPE405L)

Digital Image Processing (3+1) (EE452, EE452L)

VLSI System Design (3+1) (CPE407, CPE407L)

Communication Systems (3+1) (EE410, EE410L)

Control Systems (3+1) (CPE409, CPE409L)

Digital IC design (3+0) (CPE410)

Wireless Sensors Networks (3+0) (CPE411)

Data Mining (3+0) (CPE412)

**Multi-Disciplinary Engineering Electives (MDEE)**

CPE413 Mobile Application Development

CPE414 Human Computer Interaction

CPE415 Neural Networks and Fuzzy Logic

EE421 Computer Vision

CPE417 Systems Programming

CPE418 Robotics

CPE419 Network Security

CPE420 Big Data Analysis

CPE421 Generative AI