

B. TECH. FOUR YEAR DEGREE

PROGRAM CURRICULUM

(Applicable for the batches admitted from A.Y 2025-26)

**ELECTRONICS AND
COMMUNICATION ENGINEERING**



A D I T Y A
U N I V E R S I T Y

Aditya Nagar, ADB Road, Surampalem - 533 437



Department of Electronics and Communication Engineering

Vision:

To be a recognized centre of excellence in Electronics and Communication Engineering through quality education, innovation, and research to meet societal and industrial needs.

Mission:

M1: Delivering a robust industry aligned curriculum that empowers students to achieve global excellence.

M2: Providing state-of-the-art infrastructure that fosters innovation, critical thinking, and interdisciplinary research.

M3: Inculcating technical and entrepreneurial skills to provide socially relevant and sustainable solutions.

Program Educational Objectives:

Graduates will

PEO1: Design and develop modern electronic and communication systems with professional ethics, environmental sustainability, and social responsibility.

PEO2: Pursue successful professional careers and higher studies by cultivating a learning mindset, engaging in innovative research, and embracing lifelong learning.

PEO3: Demonstrate effective communication, leadership, and adaptability to excel in diverse, multidisciplinary, and collaborative environments.

Program Specific Outcomes:

PSO 1: Design and implement sustainable and energy-efficient solutions in Communication and Signal Processing to address societal and industrial needs.

PSO 2: Apply advanced technologies in VLSI Design and Embedded Systems to develop innovative solutions and enhance professional competence.

PROGRAM OUTCOMES (PO's)

The 11 Program Outcomes are described as below.

After successful completion of the program, the graduates will be able to

- PO1 **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2 **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences
- PO3 **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
- PO4 **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
- PO5 **Engineering tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
- PO6 **The Engineer and the world :** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
- PO7 **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- PO8 **Individual and collaborative teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- PO9 **Communication:** Communicate effectively 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.
- PO10 **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO11 **Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Department Electronics and Communication Engineering

B. Tech (ECE) Program Curriculum -2025 (Applicable for the Batches admitted from A.Y 2025-26)

UG Programs Offered

- B. Tech in (Electronics and Communication Engineering)
- B. Tech in (Electronics and Communication Engineering) with
 - Minor degree in Civil Engineering
 - Minor degree in Electrical and Electronics Engineering
 - Minor degree in Mechanical Engineering
 - Minor degree in Computer Science and Engineering
 - Minor degree in Data Science
 - Minor degree in Artificial Intelligence and Machine Learning
 - Minor degree in Mining Engineering
 - Minor degree in Petroleum Technology
 - Minor degree in Agricultural Engineering
 - Minor degree in Entrepreneurship Development and Incubation
 - Minor degree in Quantum Technologies
- Minor Streams offered in B. Tech (Electronics and Communication Engineering)
 - Minor Stream in VLSI
 - Minor Stream in Embedded Systems
 - Minor Stream in Signal Processing and Communication Technology
 - Minor Stream in Space Technology
 - Minor Stream in Technology for Digital Resilience Industry Integrated Program- L & T
 - Minor Stream in Smart Infrastructure (Electronics) Industry Integrated Program- L & T

Credit Division Category-wise

| S.No | Broad Category of Courses | UGC | Credits |
|---|--|------------|------------|
| 1 | Major Core Courses (MCC) | 80 | 80 |
| 2 | Minor Stream Courses (MSC) Or University Open Elective Courses (UEC) | 32 | 32 |
| 3 | Multidisciplinary Courses (MDC) | 9 | 9 |
| 4 | Ability Enhancement Courses (AEC) | 8 | 9 |
| 5 | Skill Enhancement Courses (SEC) | 9 | 10 |
| 6 | Value Added Courses (VAC) | 6-8 | 4 |
| 7 | Summer Internships (SI) | 2-4 | 4 |
| 8 | Full Semester Internship (PROJ) | 12 | 12 |
| 9 | Mandatory Courses (MC) | | 0 |
| Total Credits to be earned for B.Tech Degree | | 160 | 160 |

Foundation Courses – FC

Intermediate-level Courses - IC

Advanced Courses - AC

Major Core Courses (MCC)

| Course Code | Course Name | Level | L | T | P | C | CIE | SE E | Total | Pre-requisite |
|-------------|--|-------|---|---|---|---|-----|---------|-------|---------------|
| 2501MA01 | Linear Algebra & Calculus | FC | 2 | 1 | | 3 | 50 | 50 | 100 | - |
| 2501MA02 | Differential Equations & Vector Calculus | FC | 2 | 1 | | 3 | 50 | 50 | 100 | - |
| 2501MA07 | Transform Calculus | FC | 2 | 1 | | 3 | 50 | 50 | 100 | LAC, DEVC |
| 2501CH02 | Applied Chemistry | FC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501PH02 | Modern Physics | FC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501CS01 | Programming for Problem Solving Using C | FC | 2 | | 2 | 4 | 50 | 50 | 100 | - |
| 2501IT01 | Business Intelligence Lab | FC | | | 2 | 2 | 50 | 50 | 100 | - |
| 2501ME01 | Engineering Graphics | FC | 1 | | 2 | 3 | 50 | 50 | 100 | - |
| 2501ME03 | Engineering Workshop | FC | | | 1 | 1 | 100 | - | 100 | - |
| 2501EE01 | Basic Electrical & Electronics Engineering | FC | 2 | | 2 | 4 | 50 | 50 | 100 | - |
| 2501EC02 | Network Analysis | FC | 3 | 1 | | 4 | 50 | 50 | 100 | - |
| 2501EC01 | Digital Electronics & Logic Design | FC | 2 | | 2 | 4 | 50 | 50 | 100 | - |
| 2501EC03 | Electronic Devices & Circuits | FC | 2 | | 2 | 4 | 50 | 50 | 100 | BEEE |
| 2501EC04 | Random Variables & Stochastic Processes | FC | 3 | 1 | | 4 | 50 | 50 | 100 | - |
| 2501EC14 | Signals & Systems | FC | 2 | 1 | 1 | 4 | 50 | 50 | 100 | - |
| 2501EC05 | Electromagnetic Waves & Transmission Lines | IC | 2 | 1 | | 3 | 50 | 50 | 100 | DEVC |

| | | | | | | | | | | |
|--------------|------------------------------------|----|-----------|----------|-----------|-----------|----|----|-----|------|
| 2501EC06 | Analog Electronics | IC | 2 | | 2 | 4 | 50 | 50 | 100 | EDC |
| 2501EC07 | Integrated Circuits & Applications | IC | 2 | | 2 | 4 | 50 | 50 | 100 | EDC |
| 2501EC08 | Linear Control Systems | IC | 2 | 1 | | 3 | 50 | 50 | 100 | S&S |
| 2501EC09 | Analog & Digital Communications | IC | 2 | 1 | 1 | 4 | 50 | 50 | 100 | S&S |
| 2501EC10 | Digital Signal Processing | IC | 2 | | 1 | 3 | 50 | 50 | 100 | S&S |
| 2501EC11 | VLSI Design | IC | 2 | | 1 | 3 | 50 | 50 | 100 | EDC |
| 2501EC12 | Microprocessors & Microcontrollers | AC | 2 | | 1 | 3 | 50 | 50 | 100 | DELD |
| 2501EC13 | Antenna & Microwave Engineering | AC | 2 | | 2 | 4 | 50 | 50 | 100 | EMTL |
| Total | | | 45 | 9 | 26 | 80 | | | | |

Multi-Disciplinary Courses (MDC)

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|-----------------------|-------|----------|---|----------|----------|-----|-----|-------|---------------|
| 2501CS03 | Data Structures | FC | 2 | | 2 | 4 | 50 | 50 | 100 | PPSC |
| 2501MB02 | Engineering Economics | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MB03 | Management Science | FC | 2 | | | 2 | 50 | 50 | 100 | - |
| Total | | | 7 | | 2 | 9 | | | | |

Ability Enhancement Courses (AEC)

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|--|-------|----------|---|----------|----------|-----|-----|-------|---------------|
| 2501EN01 | Essential Cognitive Skills for Engineering | FC | | | 1 | 1 | 100 | - | 100 | - |
| 2501EN02 | Advanced Cognitive Skills for Engineering | FC | | | 1 | 1 | 100 | - | 100 | - |
| 2501UC07 | Design Thinking using AI | FC | | | 1 | 1 | 100 | - | 100 | - |
| 2501UC08 | Universal Human Values | FC | 2 | | | 2 | 100 | - | 100 | - |
| 2501UC09 | Technical Paper Publication | AC | | | 2 | 2 | 100 | - | 100 | - |
| 2501EC96 | Student Activity Based Learning | AC | | | | 2 | 100 | - | 100 | - |
| Total | | | 2 | | 5 | 9 | | | | |

Skill Enhancement Courses (SEC)

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|----------------------------------|-------|---|---|-----------|-----------|-----|-----|-------|---------------|
| 2501EC21 | PCB Design | FC | | | 2 | 2 | 50 | 50 | 100 | - |
| 2501EC94 | Soft Computing Tools | IC | | | 2 | 2 | 50 | 50 | 100 | - |
| 2501EC15 | Android Applications | AC | | | 2 | 2 | 50 | 50 | 100 | - |
| 2501EC16 | ECAD Tools | AC | | | 2 | 2 | 50 | 50 | 100 | VLSI |
| 2501EC17 | Verification using Verilog & UVM | AC | | | 2 | 2 | 50 | 50 | 100 | VLSI |
| Total | | | | | 10 | 10 | | | | |

Value Added Courses (VAC)

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---------------------------------------|-------|---|---|-----------|----------|-----|-----|-------|---------------|
| 2501CS04 | Internet of Things | FC | | | 1 | 1 | 50 | 50 | 100 | - |
| 2501CS02 | Data Analysis Using Python | IC | | | 2 | 2 | 50 | 50 | 100 | PPSC |
| 2501UC11 | Employability Skills-I | FC | | | 3 | 0 | 100 | - | 100 | - |
| 2501UC13 | Employability Skills-II | FC | | | 3 | 0 | 100 | - | 100 | ES-I |
| 2501UC14 | Employability Skills-III | IC | | | 3 | 0 | 100 | - | 100 | ES-II |
| 2501UC15 | Employability Skills-IV | IC | | | 3 | 0 | 100 | - | 100 | ES-III |
| 2501UC16 | Employability Skills-V | AC | | | 3 | 1 | 100 | - | 100 | ES-IV |
| 2501AC06 | Advanced Data Structures & Algorithms | AC | 2 | | 1 | 0 | 100 | - | 100 | DS |
| Total | | | | | 18 | 4 | | | | |

Summer Internships (SI)

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|----------------------|-------|---|---|----------|----------|-----|-----|-------|---------------|
| 2501EC18 | Summer Internship-I | IC | | | 2 | 2 | 100 | - | 100 | - |
| 2501EC19 | Summer Internship-II | AC | | | 2 | 2 | 100 | - | 100 | - |
| Total | | | | | 4 | 4 | | | | |

Full Semester Internship (PROJ)

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|--------------------------|-------|---|---|-----------|-----------|-----|-----|-------|---------------|
| 2501EC20 | Full Semester Internship | AC | | | 12 | 12 | 50 | 50 | 100 | - |
| Total | | | | | 12 | 12 | | | | |

Mandatory Courses (MC)

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|--|-------|-----------|---|---|----------|-----|-----|-------|---------------|
| 2501AC01 | Environmental Science | FC | 2 | | | 0 | 100 | - | 100 | - |
| 2501AC02 | Constitution of India | FC | 2 | | | 0 | 100 | - | 100 | - |
| 2501AC03 | Research Methodology | FC | 2 | | | 0 | 100 | - | 100 | - |
| 2501AC04 | Intellectual Property Rights & Patents | FC | 2 | | | 0 | 100 | - | 100 | - |
| 2501AC05 | Indian Knowledge Systems | FC | 2 | | | 0 | 100 | - | 100 | - |
| Total | | | 10 | | | 0 | | | | |

Minor Stream: VLSI

| Course Code | Course Name | Level | L | T | P | C | CIE | SE E | Total | Pre- requisite |
|-------------|---|-------|-----------|----------|----------|-----------|-----|---------|-------|-------------------|
| 2501EC86 | Digital System Design Through Verilog | IC | 2 | | 1 | 3 | 50 | 50 | 100 | DELD |
| 2501EC22 | Design for Testability | IC | 3 | | | 3 | 50 | 50 | 100 | DDTV |
| 2501EC23 | CMOS Digital IC Design | IC | 2 | 1 | | 3 | 50 | 50 | 100 | DELD |
| 2501EC30 | Testing & Verification of VLSI Circuits | IC | 3 | | | 3 | 50 | 50 | 100 | VLSI,DFT |
| 2501EC24 | Analog VLSI Design | IC | 2 | 1 | | 3 | 50 | 50 | 100 | VLSI |
| 2501EC25 | CMOS Mixed Signal IC Design | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CDICD, AVLSI |
| 2501EC28 | Low Power VLSI Design | AC | 2 | 1 | | 3 | 50 | 50 | 100 | VLSI |
| 2501EC27 | FPGAs & ASIC Design | AC | 3 | | | 3 | 50 | 50 | 100 | DDTV |
| 2501EC29 | SoC Design | AC | 3 | | | 3 | 50 | 50 | 100 | MPMC |
| 2501EC26 | Digital Design Through System Verilog | AC | 2 | 1 | | 3 | 50 | 50 | 100 | DDTV |
| 2501EC31 | VLSI Physical Design | AC | 2 | | | 2 | 50 | 50 | 100 | LPVLSID |
| | Total | | 26 | 4 | 2 | 32 | | | | |

Minor Stream: Embedded Systems

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|----------|----------|-----------|-----|-----|-------|---------------|
| 2501EC38 | Microcontrollers for Embedded Systems | IC | 3 | | | 3 | 50 | 50 | 100 | MPMC |
| 2501EC34 | Embedded System Design | IC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501EC40 | Programming Languages for Embedded System | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC42 | Wireless LAN's & PAN's | IC | 2 | 1 | | 3 | 50 | 50 | 100 | ESD |
| 2501EC39 | Parallel Processing | IC | 3 | | | 3 | 50 | 50 | 100 | MPMC |
| 2501EC33 | Embedded Computing | AC | 2 | | | 2 | 50 | 50 | 100 | ERTS |
| 2501EC32 | Embedded & Real Time Systems | AC | 2 | 1 | | 3 | 50 | 50 | 100 | ESD |
| 2501EC36 | Hardware interfacing & Networking | AC | 3 | | | 3 | 50 | 50 | 100 | ESD |
| 2501EC35 | Hardware & Software Co-Design | AC | 2 | 1 | | 3 | 50 | 50 | 100 | ESD |
| 2501EC37 | Internet of Things & its applications | AC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501EC41 | Smart Sensors & Devices for Agriculture | AC | 3 | | | 3 | 50 | 50 | 100 | IOTA |
| Total | | | 27 | 3 | 2 | 32 | | | | |

Minor Stream: Signal Processing and Communication Technology

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|----------|----------|-----------|-----|-----|-------|---------------|
| 2501EC45 | Fundamentals of Speech Processing | IC | 2 | | 1 | 3 | 50 | 50 | 100 | S&S |
| 2501EC46 | Information Theory & Coding Techniques | IC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501EC44 | Digital Signal Processors & Architectures | IC | 2 | 1 | | 3 | 50 | 50 | 100 | DSP |
| 2501EC43 | Digital Image Processing | IC | 2 | | 1 | 3 | 50 | 50 | 100 | S&S |
| 2501EC49 | Radar Engineering | IC | 3 | | | 3 | 50 | 50 | 100 | ADCM |
| 2501EC51 | Soft Computing Techniques | AC | 2 | 1 | | 3 | 50 | 50 | 100 | - |
| 2501EC47 | Optical Communications | AC | 3 | | | 3 | 50 | 50 | 100 | ADCM |
| 2501EC50 | Satellite Communications | AC | 3 | | | 3 | 50 | 50 | 100 | ADCM |
| 2501EC48 | Pattern Recognition | AC | 2 | | | 2 | 50 | 50 | 100 | DIP |
| 2501EC52 | Wireless Communications | AC | 2 | 1 | | 3 | 50 | 50 | 100 | ADCM |
| 2501EC53 | Wireless Sensor Networks | AC | 3 | | | 3 | 50 | 50 | 100 | IOT |
| Total | | | 26 | 3 | 3 | 32 | | | | |

Minor Stream: Space Technology

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|----------|---|-----------|-----|-----|-------|---------------|
| 2501EC54 | Introduction to Space Laws | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC55 | Aircraft Communication Systems | IC | 2 | 1 | | 3 | 50 | 50 | 100 | - |
| 2501EC57 | Aircraft Navigation Systems | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC62 | Missile & Space Vehicle Guidance & Control | IC | 2 | | | 2 | 50 | 50 | 100 | - |
| 2501EC60 | Flight Control Systems | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC58 | Avionics Embedded Systems | IC | 2 | 1 | | 3 | 50 | 50 | 100 | - |
| 2501EC59 | Avionics Network Technology | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC64 | Unmanned Aircraft Systems | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC56 | Aerospace Electromagnetic Compatibility | AC | 2 | 1 | | 3 | 50 | 50 | 100 | - |
| 2501EC61 | Global Navigation Satellite Systems & Applications | AC | 3 | | | 3 | 50 | 50 | 100 | SC |
| 2501EC63 | Remote Sensing & Digital Image Processing of Satellite Data | AC | 3 | | | 3 | 50 | 50 | 100 | DIP |
| Total | | | 29 | 3 | | 32 | | | | |

**Minor Stream: Technology for Digital Resilience
Industry Integrated Program- L & T**

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|----------|----------|-----------|-----|-----|-------|---------------|
| 2501EC66 | Software Defined Radio | IC | 3 | 1 | | 4 | 50 | 50 | 100 | - |
| 2501EC67 | Introduction to Internet of Things | IC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501EC68 | Cloud based Internet of Things | IC | 2 | | 2 | 4 | 50 | 50 | 100 | IIoT |
| 2501EC69 | Cyber Defence & Information Security | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC70 | Industrial Applications of Microcontrollers - A Practice based approach | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC65 | Applied Industrial IoT | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC71 | Data Engineering, Analytics & Security in Industries | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC72 | Cloud Adoption & Management Techniques | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC73 | Artificial Intelligence & Edge Computing | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC74 | Modern Wireless Communications | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| Total | | | 28 | 1 | 3 | 32 | | | | |

#Syllabus for the industry partner courses will be released in the department as and when Required.

Minor Stream: Smart Infrastructure (Electronics)
Industry Integrated Program- L & T

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|--|-------|-----------|---|----------|-----------|-----|-----|-------|---------------|
| 2501EC75 | Digital Data Communications | IC | 3 | | 1 | 4 | 50 | 50 | 100 | - |
| 2501EC76 | Introduction to Machine Learning | IC | 3 | | 1 | 4 | 50 | 50 | 100 | - |
| 2501EC77 | Sensors & Transducers | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC78 | Cyber Physical Systems for Industrial Applications | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC65 | Applied Industrial IoT | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC79 | Drone Technology and its Transformative Applications- A Practitioner's Perspective | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC73 | Artificial Intelligence and Edge Computing | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC80 | 5G Technology for Smarter & Secure Connectivity | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC74 | Modern Wireless Communications | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501EC81 | Chip based VLSI Design for Industrial Applications | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| Total | | | 30 | | 2 | 32 | | | | |

#Syllabus for the industry partner courses will be released in the department as and when Required.

UNIVERSITY OPEN ELECTIVE COURSES

| AI & ML | | | | | | | | | | | |
|--------------|-----------------------------|-------|----|---|----|----|-----|-----|-------|--|---------------|
| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Offered to Programs | Pre-requisite |
| 2501AI02 | Artificial Intelligence | FC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | DAP |
| 2501AI05 | Machine Learning | FC | 2 | | 2 | 4 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | DAP |
| 2501AI27 | AI & Data Science | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | DAP |
| 2501AI28 | AI in Healthcare | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE CSE, IT, AIML, CSE(DS) PT, Min.E | DAP |
| 2501AI11 | Deep Learning | IC | 2 | | 2 | 4 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | DAP |
| 2501AI10 | Natural Language Processing | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | DAP |
| 2501AI09 | Reinforcement Learning | AC | 1 | | 2 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | DAP |
| 2501AI29 | AI in Agriculture | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | DAP |
| 2501AI30 | Robotics & AI | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | DAP |
| 2501AI31 | AI in Finance & Economics | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | DAP |
| Total | | | 19 | | 13 | 32 | | | | | |

| Production Excellence | | | | | | | | | | | |
|-----------------------|--|-------|-----------|---|----------|-----------|-----|-----|-------|---|---------------|
| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Offered to Programs | Pre-requisite |
| 2501ME81 | Fundamentals of Production Excellence | FC | 2 | | | 2 | 50 | 50 | 100 | CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT,Min.E | - |
| 2501ME82 | Six Sigma for Production Excellence | FC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | FPE |
| 2501ME83 | Quality Excellence in Production | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | FPE |
| 2501ME84 | Digital Transformation for Production Excellence | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | FPE |
| 2501ME85 | Agile Production Systems | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | FPE |
| 2501ME86 | Process Excellence & Optimization | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | FPE |
| 2501ME87 | Risk Management in Production Excellence | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | FPE |
| 2501ME88 | Ethical & Social Responsibility in Production Excellence | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | FPE |
| 2501ME89 | Data-Driven Decision Making for Production Excellence | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, MinE | FPE |
| 2501ME58 | Industry 5.0 for Engineers | AC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ECE, CSE, IT, AIML, CSE(DS). PT, MinE | FPE |
| 2501ME90 | Cost Excellence in Production | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | FPE |
| Total | | | 23 | | 9 | 32 | | | | | |

| Supply Chain Management | | | | | | | | | | | |
|-------------------------|---|-------|---|---|---|---|-----|-----|-------|--|---------------|
| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Offered to Programs | Pre-requisite |
| 2501MB17 | Introduction to Supply Chain Management | FC | 2 | | | 2 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | - |
| 2501MB18 | Logistics & Distribution Management | FC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |
| 2501MB19 | Supply Chain Project Management | IC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |
| 2501MB20 | Supply Chain Innovation & Trends | IC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |
| 2501MB21 | Supply Chain Analytics | IC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |
| 2501MB22 | Demand Planning & Forecasting | IC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |
| 2501MB23 | Supply Chain Risk Management | AC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |
| 2501MB24 | Inventory Management & Control | AC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |
| 2501MB25 | E-Commerce & Supply Chain Management | AC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |
| 2501MB26 | Operations Management | AC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | ISCM |

| | | | | | | | | | | | |
|--------------|---|----|-----------|--|--|-----------|----|----|-----|--|------|
| 2501MB27 | Supply Chain Ethics & Corporate Social Responsibility (CSR) | AC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, CSE,IT, AIMLCSE(DS) PT,Min.E | ISCM |
| Total | | | 32 | | | 32 | | | | | |

| Sustainability | | | | | | | | | | | |
|-----------------------|--|-------|---|---|---|---|-----|-----|-------|--|---------------|
| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Offered to Programs | Pre-requisite |
| 2501CE74 | Introduction to Sustainable Development | FC | 2 | | | 2 | 50 | 50 | 100 | CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT,Min.E | - |
| 2501CE66 | Natural Disaster Management & Mitigation | FC | 3 | | | 3 | 50 | 50 | 100 | EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT, Min.E | - |
| 2501CE81 | Waste Water Management | IC | 3 | | | 3 | 50 | 50 | 100 | EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT, Min.E | - |
| 2501CE82 | Integrated Solid Waste Management for a Smart City | IC | 3 | | | 3 | 50 | 50 | 100 | EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT, Min.E | - |
| 2501CE83 | Watershed Management | IC | 3 | | | 3 | 50 | 50 | 100 | EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E | - |
| 2501EE33 | Energy Audit, Conservation & Management | IC | 3 | | | 3 | 50 | 50 | 100 | CE, ME, ECE, CSE,IT, AIML, CSE(DS) PT, Min.E | BEEE |
| 2501EE53 | Electric Power Generation, Transmission & Distribution Systems | AC | 3 | | | 3 | 50 | 50 | 100 | CE, ME, ECE, CSE,IT, AIML, CSE(DS) PT, Min.E | BEEE |
| 2501CE75 | Sustainable Agriculture & Food Systems | AC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT, Min.E | - |

| | | | | | | | | | | | |
|--------------|--|----|-----------|--|--|-----------|----|----|-----|---|---|
| 2501CE76 | Sustainable Supply Chain Management | AC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT, Min.E | - |
| 2501CE77 | Sustainable Production Excellence | AC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT, Min.E | - |
| 2501CE78 | AI in Environmental Science and Sustainability | AC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML,CSE(DS) PT, Min.E | - |
| Total | | | 32 | | | 32 | | | | | |

| Security | | | | | | | | | | | |
|-------------|---|-------|---|---|---|---|-----|-----|-------|----------------------------|---------------|
| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Offered to Programs | Pre-requisite |
| 2501CS32 | Cybersecurity Essentials | FC | 2 | | 1 | 3 | 50 | 50 | 100 | CE,EEE, ME, ECE, PT, Min.E | - |
| 2501IT35 | Security in Software Development | FC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE, ME, ECE, PT, Min.E | - |
| 2501CS28 | Ethical Hacking | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT, Min.E | - |
| 2501CS69 | Cloud Security | IC | | | 3 | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT, Min.E | - |
| 2501IT36 | Security & Compliance in Business | IC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT, Min.E | - |
| 2501IT37 | Cryptography & Data Security | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT, Min.E | - |
| 2501IT38 | Security Awareness & Social Engineering | AC | 2 | | 1 | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT,Min.E | - |
| 2501IT39 | Cybersecurity Policy & Strategy | AC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT, Min.E | - |
| 2501IT40 | Security in Emerging Technologies | AC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT, Min.E | - |

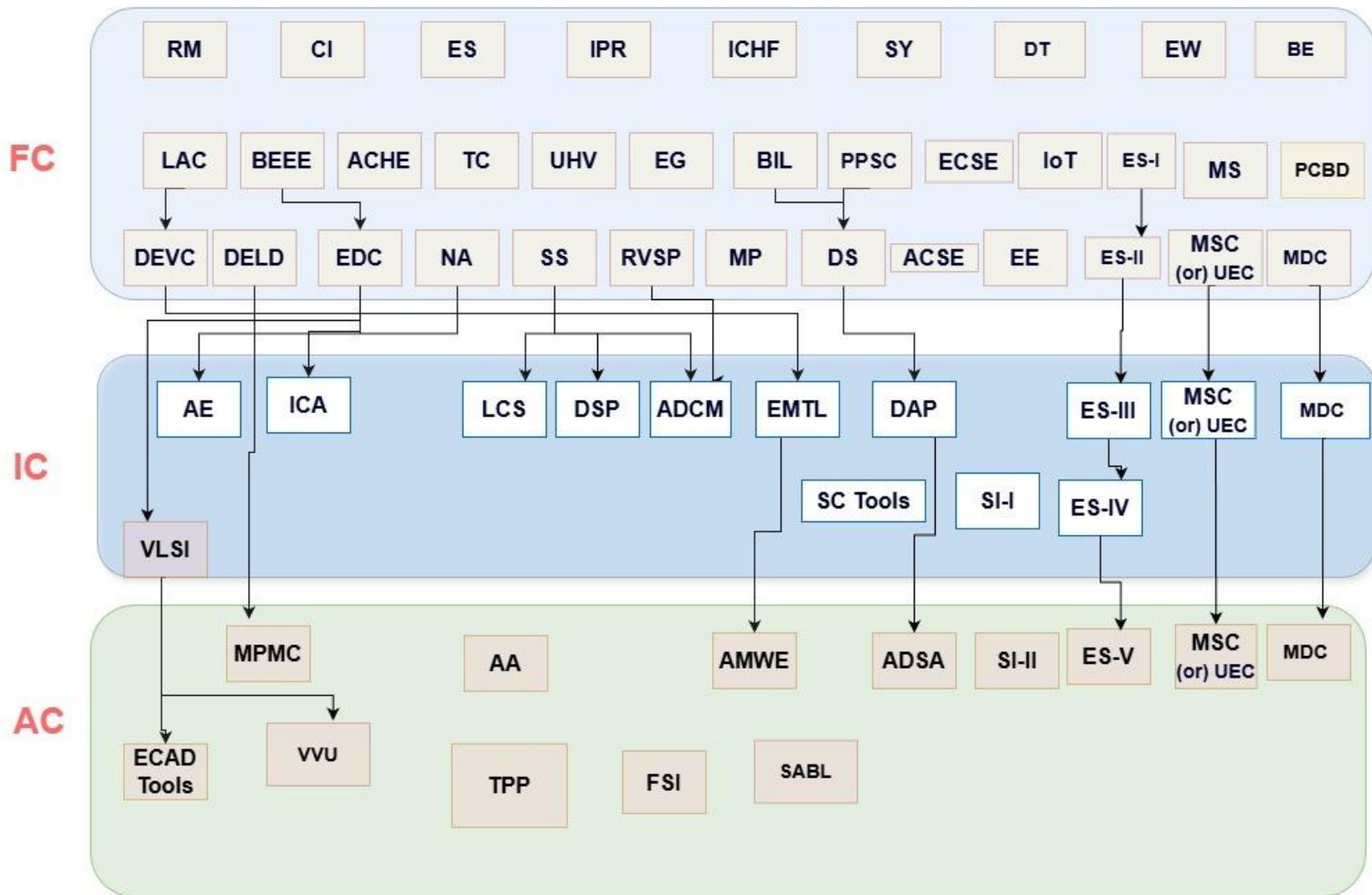
| | | | | | | | | | | | |
|--------------|--|----|-----------|--|-----------|-----------|----|----|-----|---------------------------|---|
| 2501CS30 | Information Security Analysis & Audit | AC | 2 | | | 2 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT, Min.E | - |
| 2501IT41 | Financial Information Security & Privacy | AC | 3 | | | 3 | 50 | 50 | 100 | CE,EEE,ME, ECE, PT, Min.E | - |
| Total | | | 25 | | 07 | 32 | | | | | |

| Others | | | | | | | | | | | |
|-------------|-----------------------------------|-------|---|---|---|---|-----|-----|-------|--|---------------|
| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Offered to Programs | Pre-requisite |
| 2501CE80 | Remote Sensing & GIS Applications | FC | 3 | | | 3 | 50 | 50 | 100 | EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E | - |
| 2501EE36 | Electric Energy Storage Systems | FC | 3 | | | 3 | 50 | 50 | 100 | CE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E | BEEE |
| 2501EE43 | Electrical safety | IC | 3 | | | 3 | 50 | 50 | 100 | CE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E | BEEE |
| 2501EE54 | Hybrid & Electric Vehicles | IC | 3 | | | 3 | 50 | 50 | 100 | CE, ECE, CSE, IT, AIML, CSE(DS) PT,Min.E | BEEE |
| 2501ME73 | Organizational Behaviour | FC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT,Min.E | - |
| 2501ME36 | Sustainable Energy Systems | FC | 3 | | | 3 | 50 | 50 | 100 | CE, ECE, CSE, IT, AIML, CSE(DS) PT,Min.E | - |
| 2501ME37 | Solar Energy Systems | FC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT,Min.E | - |
| 2501ME60 | Composite Materials | IC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | SSP/MP |

| | | | | | | | | | | | |
|----------|--|----|---|--|---|---|----|----|-----|--|------|
| 2501EC82 | Communication Systems | FC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, CSE, IT, AIML, CSE(DS) PT, Min.E | - |
| 2501EC83 | Electronic Measurements & Instrumentation | FC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, CSE, IT, AIML, CSE(DS), PT, Min.E | BEEE |
| 2501EC84 | Introduction to Embedded Systems | FC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, CSE, IT, AIML, CSE(DS), PT, Min.E | - |
| 2501EC85 | Fundamentals of Image Processing | FC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, CSE, IT, AIML, CSE(DS), PT, Min.E | |
| 2501EC77 | Sensors and Transducers | IC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, CSE, IT, AIML, CSE(DS) PT, Min.E | |
| 2501CS03 | Data Structures | FC | 2 | | 2 | 4 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | PPSC |
| 2501CS65 | Computer Organization | FC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501CS13 | Operating Systems | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501IT05 | Database Management Systems | IC | 2 | | 2 | 4 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | PPSC |
| 2501IT07 | Agile Software Engineering | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | PPSC |
| 2501CS07 | Computer Networks | IC | 2 | | 1 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501IT06 | Java Programming | IC | 2 | | 2 | 4 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | PPSC |
| 2501CS68 | Fundamentals of RedHat Enterprise Linux | FC | | | 2 | 2 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501CS67 | AWS Cloud Foundations | IC | | | 3 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501CS66 | AWS Cloud Development | AC | | | 3 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501CS70 | Continuous integration & delivery using DevOps | AC | | | 3 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |

| | | | | | | | | | | | |
|----------|--|----|---|--|---|---|----|----|-----|--|------|
| 2501IT24 | Fundamentals of Salesforce Administration | FC | | | 2 | 2 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501IT34 | Advanced Salesforce Administration | AC | | | 3 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501IT23 | Principles of Pega Systems | IC | | | 3 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501IT26 | Pega System Architecture & Design | AC | | | 3 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E | - |
| 2501MB04 | Entrepreneurship Development & Incubation | IC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | - |
| 2501MB05 | Business Ethics & Corporate Governance | AC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | - |
| 2501MB06 | Entrepreneurship Development & Business Management | AC | 1 | | 2 | 3 | 50 | 50 | 100 | CE, EEE, ME, ECE, CSE, IT, AIML, CSE(DS) PT, Min.E | - |
| 2501EC29 | SoC Design | AC | 3 | | | 3 | 50 | 50 | 100 | CE, EEE, ME, CSE, IT, AIML, CSE (DS), PT, Min.E. | MPMC |
| 2501CS23 | Cloud Computing | FC | 2 | | 2 | 4 | 50 | 50 | 100 | CE, EEE, ME, ECE, PT, Min.E. | - |

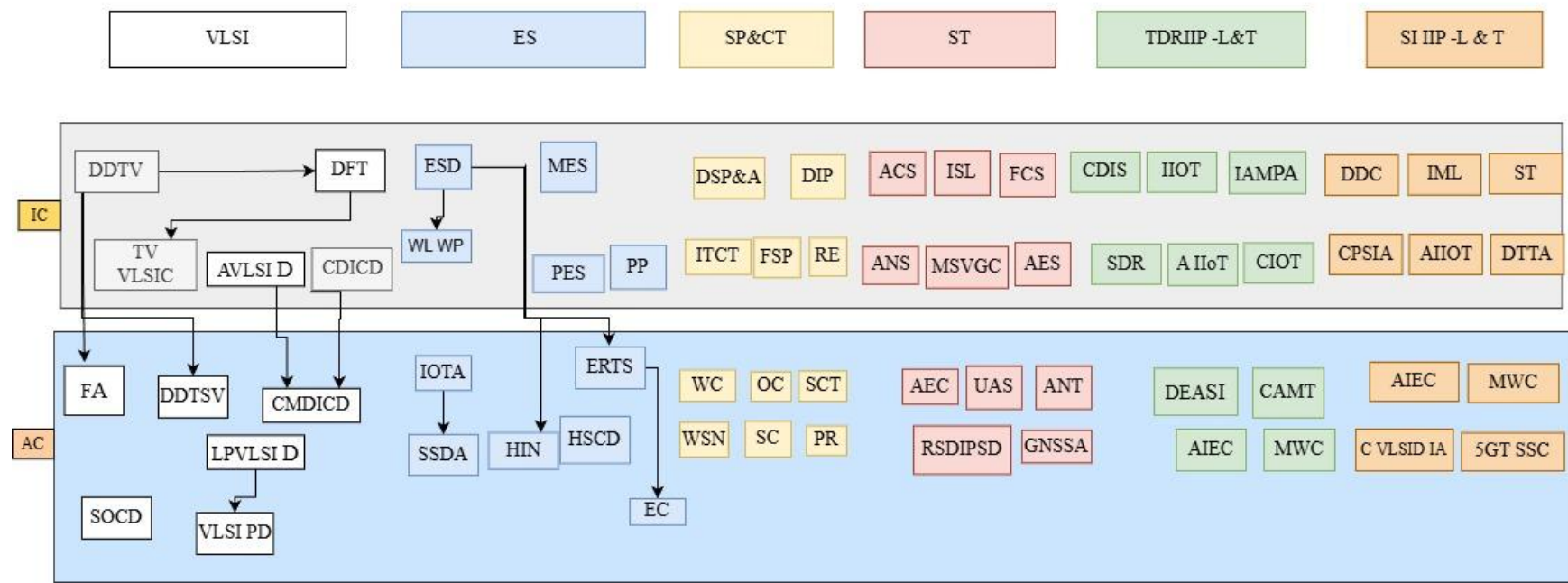
B.Tech (ECE) Program Curriculum Pre-requisite Flowchart



| FOUNDATION COURSES | | INTERMEDIATE-LEVEL COURSES | | ADVANCED COURSES | |
|--------------------|--|----------------------------|--|------------------|---------------------------------------|
| LAC | Linear Algebra & Calculus | EMTL | Electromagnetic Waves & Transmission Lines Analog Electronics | MPMC | Microprocessors & Microcontrollers |
| DEVC | Differential Equations & Vector Calculus | AE | | AMWE | Antenna & Microwave Engineering |
| TC | Transform Calculus | ICA | Integrated Circuits & Applications | DIP | Digital Image Processing |
| ACHE | Applied Chemistry | LCS | Linear Control Systems | AA | Android Applications |
| MP | Modern Physics | ADC M | Analog & Digital Communications | ECAD | ECAD Tools |
| PPSC | Programming for Problem Solving Using C | DSP | Digital Signal Processing | VVU | Verification using Verilog & UVM |
| | | | | ADSA | Advanced Data Structures & algorithms |
| BIL | Business Intelligence Lab | DAP | Data Analysis Using Python | SI-II | Summer Internship-II |
| PCBD | PCB Design | VLSI | VLSI | TPP | Technical Paper Publication |
| EG | Engineering Graphics | SC Tools | Soft Computing Tools | FSI | Full Semester Internship |
| EW | Engineering Workshop | SI-I | Summer Internship-I | ES-V | Employability Skills-V |
| BEEE | Basic Electrical & Electronics Engineering | ES-III | Employability Skills-III | SABL | Student Activity based Learning |
| NA | Network Analysis | ES-IV | Employability Skills-IV | | |
| DELD | Digital Electronics & Logic Design | | | | |
| EDC | Electronic Devices & Circuits | | | | |
| RVSP | Random Variables & Stochastic Processes | | | | |
| SS | Signals & Systems | | | | |
| ECSE | Essential Cognitive Skills for Engineers | | | | |
| ACSE | Advanced Cognitive Skills for Engineers | | | | |
| DT | Design Thinking using AI | | | | |
| UHV | Universal Human Values | | | | |
| IOT | Internet of Things | | | | |
| EE | Engineering Economics | | | | |
| MS | Management Science | | | | |
| DS | Data Structures | | | | |
| ES | Environmental Science | | | | |

| | |
|-------|---|
| COI | Constitution of India |
| RM | Research Methodology |
| IPR | Intellectual Property Rights & Patents |
| ES-I | Employability Skills-I |
| ES-II | Employability Skills-II |
| BE | Biology for Engineers |

**B.Tech (ECE) Minor Stream
Pre-requisite Flow Chart**



INTERMEDIATE - LEVEL COURSES
ADVANCED COURSES

| | | | | |
|---|--------|---|---------|---|
| VLSI | DDTV | Digital System Design Through Verilog | CMICD | CMOS Mixed Signal IC Design |
| | DFT | Design for Testability | LVLSI | Low Power VLSI Design |
| | CDIC | CMOS Digital IC Design | FA | FPGAs & ASIC Design |
| | D | | | |
| | TVVL | Testing & Verification of VLSI Circuits | SoCD | SoC design |
| Embedded Systems-ES | AVLSI | Analog VLSI Design | DDTSV | Digital System Design Through System Verilog |
| | | | VLSIPD | VLSI Physical System Design |
| | MES | Microcontrollers for Embedded Systems | ERTS | Embedded & Real Time Systems |
| | ESD | Embedded System Design | HSCD | Hardware & Software Codesign |
| | PES | Programming Languages for Embedded System | SSDAS | Smart Sensors & Devices for Agriculture |
| | WLW | Wireless LAN's & PAN's | HIN | Hardware interfacing & Networking |
| | PP | Parallel Processing | EC | Embedded Computing |
| | | | IOTA | Internet of Things & its Applications. |
| | | | SCT | Soft Computing Techniques |
| | | | OC | Optical Communications |
| Signal Processing and Communication Technology-ST&CT | FSP | Fundamentals of Speech Processing | SC | Satellite Communications |
| | ITCT | Information Theory & Coding Techniques | WC | Wireless Communications |
| | DSPA | Digital Signal Processors & Architectures | WSN | Wireless Sensor Networks |
| | RE | Radar Engineering | PR | Pattern Recognition |
| | DIP | Digital Image Processing | ANS | Avionics Technology |
| | ISL | Introduction to Space Laws | GNSSA | Global Navigation Satellite Systems & Applications |
| | ACS | Aircraft Communication Systems | UAS | Unmanned Aircraft System |
| Space Technology-ST | ANS | Aircraft Navigation Systems | AEC | Aerospace Electromagnetic Compatibility |
| | MSV | Missile & Space Vehicle Guidance and Control | RSDIPSD | Remote Sensing & Digital Image Processing of Satellite Data |
| | GC | | | |
| | FCS | Flight Control System | | |
| | AEC | Avionics Embedded System | | |
| Technology for Digital Resilience Industry Integrated Program- L & T-TDRIP-L&T | CDIS | Cyber Defence & Information Security | DEASI | Data Engineering, Analytics & Security in Industries |
| | IAMP | Industrial Applications of Microcontrollers - A Practice based approach | CAMT | Cloud Adoption & Management Techniques |
| | A | | AIEC | Artificial Intelligence & Edge Computing |
| | AllIoT | Applied Industrial IoT | IIoT | Introduction to Internet of things |
| | SDR | Software Defined Radio | | |

**Smart
Infrastructure
(Electronics)
Industry
Integrated
Program- L &
T**

| | | | |
|-------|---|---------|--|
| CBIoT | Cloud Based IoT | MWC | Modern Wireless communication |
| CPSIA | Cyber Physical Systems for Industrial Applications | 5GTSSC | 5G Technology for Smarter & Secure Connectivity |
| | Drone Technology and its | CVLSIIA | Chip based VLSI Design for Industrial Applications |
| DTTA | Transformative Applications -A Practitioner's Perspective | | |
| DDC | Digital Data Communication | | |
| IML | Introduction to Machine Learning | | |
| S&T | Sensors & Transducers | | |

Suggestive Semester-wise Curriculum

I SEMESTER

| Course code | Course Title | Course | | | | | | Total Hours |
|-------------|--|----------|-------|-----------|----------|----------|-----------|-------------|
| | | Category | Level | L | T | P | C | |
| 2501MA01 | Linear Algebra & Calculus | MCC | FC | 2 | 1 | | 3 | 3 |
| 2501CH02 | Applied Chemistry | MCC | FC | 2 | | 1 | 3 | 4 |
| 2501CS01 | Programming for Problem Solving Using C | MCC | FC | 2 | | 2 | 4 | 6 |
| 2501EE01 | Basic Electrical & Electronics Engineering | MCC | FC | 2 | | 2 | 4 | 6 |
| 2501IT01 | Business Intelligence Lab | MCC | FC | | | 2 | 2 | 4 |
| 2501EN01 | Essential Cognitive Skills for Engineers | AEC | FC | | | 1 | 1 | 2 |
| 2501UC08 | Universal Human Values | AEC | FC | 2 | | | 2 | 2 |
| | Total | | | 10 | 1 | 8 | 19 | 27 |

II SEMESTER

| Course code | Course Title | Course | | | | | | Total Hours |
|-------------|--|----------|-------|-----------|----------|-----------|-----------|-------------|
| | | Category | Level | L | T | P | C | |
| 2501MA02 | Differential Equations & Vector Calculus | MCC | FC | 2 | 1 | | 3 | 3 |
| 2501PH02 | Modern Physics | MCC | FC | 2 | | 1 | 3 | 4 |
| 2501ME01 | Engineering Graphics | MCC | FC | 1 | | 2 | 3 | 5 |
| 2501EC02 | Network Analysis | MCC | FC | 3 | 1 | | 4 | 4 |
| 2501ME03 | Engineering Workshop | MCC | FC | | | 1 | 1 | 2 |
| 2501CS03 | Data Structures | MDC | FC | 2 | | 2 | 4 | 6 |
| 2501UC07 | Design Thinking using AI | AEC | FC | | | 1 | 1 | 2 |
| 2501EN02 | Advanced Cognitive Skills for Engineers | AEC | FC | | | 1 | 1 | 2 |
| 2501UC11 | Employability Skills-I | VAC | FC | | | 3 | 0 | 3 |
| 2501AC01 | Environmental Science | MC | FC | 2 | | | 0 | 2 |
| 2501EC21 | PCB Design | SEC | FC | | | 2 | 2 | 4 |
| | Total | | | 12 | 2 | 13 | 22 | 37 |

III SEMESTER

| Course code | Course Title | Course | | | | | | Total Hours |
|-------------|---------------------------------------|----------|-------|-----------|----------|----------|-----------|-------------|
| | | Category | Level | L | T | P | C | |
| 2501MA07 | Transform Calculus | MCC | FC | 2 | 1 | | 3 | 3 |
| 2501EC01 | Digital Electronics & Logic Design | MCC | FC | 2 | | 2 | 4 | 6 |
| 2501EC03 | Electronic Devices & Circuits | MCC | FC | 2 | | 2 | 4 | 6 |
| 2501EC14 | Signals & Systems | MCC | FC | 2 | 1 | 1 | 4 | 5 |
| 2501MB02 | Engineering Economics | MDC | FC | 3 | | | 3 | 3 |
| 2501CS04 | Internet of Things | VAC | FC | | | 1 | 1 | 2 |
| 2501AC06 | Advanced Data Structures & Algorithms | VAC | AC | 2 | | 1 | | 2 |
| 2501UC13 | Employability Skills-II | VAC | FC | | | 3 | 0 | 3 |
| 2501AC02 | Constitution of India | MC | FC | 2 | | | 0 | 2 |
| | Total | | | 13 | 2 | 9 | 19 | 32 |

IV SEMESTER

| Course code | Course Title | Course | | | | | | Total Hours |
|-------------|---|---------------|-------|-----------|----------|-----------|-----------|-------------|
| | | Category | Level | L | T | P | C | |
| 2501EC04 | Random Variables & Stochastic Processes | MCC | FC | 3 | 1 | | 4 | 4 |
| 2501EC06 | Analog Electronics | MCC | IC | 2 | | 2 | 4 | 6 |
| 2501EC08 | Linear Control Systems | MCC | IC | 2 | 1 | | 3 | 3 |
| | Minor Stream Course-1or University Open Elective Course -1 | MSC or UEC | FC | 2 | | 1 | 3 | 4 |
| 2501MB03 | Management Science | MDC | FC | 2 | | | 2 | 2 |
| 2501EC94 | Soft Computing Tools | SEC | IC | | | 2 | 2 | 4 |
| 2501CS02 | Data Analysis Using Python | VAC | IC | | | 2 | 2 | 4 |
| 2501UC14 | Employability Skills-III | VAC | IC | | | 3 | 0 | 3 |
| 2501AC03 | Research Methodology | MC | FC | 2 | | | 0 | 2 |
| | Total | | | 13 | 2 | 10 | 20 | 32 |

V SEMESTER

| Course code | Course Title | Course | | | | | | Total Hours |
|-------------|--|------------|-------|-----------|----------|----------|-----------|-------------|
| | | Category | Level | L | T | P | C | |
| 2501EC05 | Electromagnetic Waves & Transmission Lines | MCC | IC | 2 | 1 | | 3 | 3 |
| 2501EC09 | Analog & Digital Communications | MCC | IC | 2 | 1 | 1 | 4 | 5 |
| 2501EC07 | Integrated Circuits & Applications | MCC | IC | 2 | | 2 | 4 | 6 |
| 2501EC12 | Microprocessors & Microcontrollers | MCC | AC | 2 | | 1 | 3 | 4 |
| | Minor Stream Course -2 or University Open Elective Course -2 | MSC or UEC | IC | 3 | | | 3 | 3 |
| 2501UC15 | Employability Skills-IV | VAC | IC | | | 3 | 0 | 3 |
| 2501EC18 | Summer Internship-I | SI | IC | | | 2 | 2 | 4 |
| 2501AC04 | Intellectual Property Rights & Patents | MC | FC | 2 | | | 0 | 2 |
| | Total | | | 13 | 2 | 9 | 19 | 30 |

VI SEMESTER

| Course code | Course Title | Course | | | | | | Total Hours |
|-------------|--|------------|-------|-----------|----------|----------|-----------|-------------|
| | | Category | Level | L | T | P | C | |
| 2501EC10 | Digital Signal Processing | MCC | IC | 2 | | 1 | 3 | 4 |
| 2501EC11 | VLSI Design | MCC | IC | 2 | | 1 | 3 | 4 |
| 2501EC13 | Antenna & Microwave Engineering | MCC | AC | 2 | | 2 | 4 | 6 |
| | Minor Stream Course-3 or University Open Elective Course -3 | MSC or UEC | IC | 2 | | 1 | 3 | 4 |
| | Minor Stream Course -4 or University Open Elective Course -4 | MSC or UEC | IC | 2 | 1 | | 3 | 3 |
| | Minor Stream Course -5 or University Open Elective Course -5 | MSC or UEC | AC | 2 | 1 | | 3 | 3 |
| 2501EC16 | ECAD Tools | SEC | AC | | | 2 | 2 | 4 |
| 2501AC05 | Indian Knowledge Systems | MC | FC | 2 | | | | 2 |
| | Total | | | 14 | 2 | 7 | 21 | 30 |

VII SEMESTER

| Course code | Course Title | Course | | | | | | Total Hours |
|-------------|--|--------------|-------|-----------|----------|----------|-----------|-------------|
| | | Category | Level | L | T | P | C | |
| | Minor Stream Course -6 or University Open Elective Course -6 | MSC (or) UEC | IC | 2 | 1 | | 3 | 3 |
| | Minor Stream Course -7 or University Open Elective Course -7 | MSC (or) UEC | IC | 3 | | | 3 | 3 |
| | Minor Stream Course -8 or University Open Elective Course -8 | MSC (or) UEC | AC | 2 | 1 | | 3 | 3 |
| | Minor Stream Courses -9 or University Open Elective Course -9 | MSC (or) UEC | AC | 3 | | | 3 | 3 |
| | Minor Stream Course -10 or University Open Elective Course -10 | MSC (or) UEC | AC | 3 | | | 3 | 3 |
| | Minor Stream Course -11 or University Open Elective Course -11 | MSC (or) UEC | AC | 2 | | | 2 | 2 |
| 2501EC17 | Verification using Verilog & UVM | SEC | AC | | | 2 | 2 | 4 |
| 2501EC19 | Summer Internship-II | SI | IC | | | 2 | 2 | 4 |
| | Total | | | 15 | 2 | 4 | 21 | 25 |

VIII SEMESTER

| Course code | Course Title | Course | | | | | | Total Hours |
|-------------|---------------------------------|----------|-------|---|---|-----------|-----------|-------------|
| | | Category | Level | L | T | P | C | |
| 2501EC15 | Android Applications | SEC | AC | | | 2 | 2 | 4 |
| 2501UC09 | Technical Paper Publication | AEC | AC | | | 2 | 2 | 4 |
| 2501UC16 | Employability Skills-V | VAC | AC | | | 3 | 1 | 3 |
| 2501EC96 | Student Activity Based Learning | AEC | AC | | | | 2 | |
| 2501EC20 | Full Semester Internship | PROJ | AC | | | 12 | 12 | 24 |
| | Total | | | | | 19 | 19 | 35 |

Total Credits:160

**Minor Degree in Electronics and Communication Engineering
(Offered to other branches students):**

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-Requisite |
|--------------|--|-------|-----------|----------|----------|-----------|-----|-----|-------|--------------------|
| 2501EC87 | Fundamentals of Communications | FC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501EC88 | Fundamentals of Signal Processing | FC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501EC89 | Analog & Digital Circuits | IC | 2 | | | 2 | 50 | 50 | 100 | BEEE |
| 2501EC42 | Wireless LAN's & PAN's | IC | 2 | 1 | | 3 | 50 | 50 | 100 | - |
| 2501EC90 | Linear & Digital IC Applications (or) Sensors & Actuators | IC | 3 | | | 3 | 50 | 50 | 100 | ADC |
| 2501EC91 | | | | | | | | | | |
| 2501EC92 | Embedded Microcontrollers (or) Digital System Design | IC | 2 | | 1 | 3 | 50 | 50 | 100 | ADC, PPSC |
| 2501EC93 | | | | | | | | | | |
| 2501EC67 | Introduction to Internet of things (or) Modern Wireless Communications | AC | 2 | | 1 | 3 | 50 | 50 | 100 | EM, WLAN's & PAN's |
| 2501EC74 | | | 3 | | | 3 | 50 | 50 | 100 | FC |
| Total | | | 15 | 1 | 4 | 20 | | | | |

Minor Degree in Civil Engineering

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|----------|----------|-----------|-----|-----|-------|---------------|
| 2501CE25 | Repair & Rehabilitation of Structures | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501CE43 | Building Planning & Computer-Aided Drawing | FC | | | 2 | 2 | 50 | 50 | 100 | - |
| 2501CE27 | Green Buildings | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501CE40 | Fundamentals of Soil Behaviour | FC | 2 | 1 | | 3 | 50 | 50 | 100 | - |
| 2501CE54 | Railway Engineering(or) Docks & Harbour Engineering | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501CE47 | | | | | | | | | | |
| 2501CE36 | Environmental Impact & Risk Management(or) Environmental Management | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501CE37 | | | | | | | | | | |
| 2501CE56 | Urban Transportation Planning(or) Intelligent Transportation Systems | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501CE49 | | | | | | | | | | |
| Total | | | 17 | 1 | 2 | 20 | | | | |

Minor Degree in Electrical and Electronics Engineering

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|--|-------|-----------|----------|----------|-----------|-----|-----|-------|-------------------|
| 2501EE55 | Operation & Control of Electric machines | FC | 2 | | | 2 | 50 | 50 | 100 | BEEE |
| 2501EE56 | Fundamentals of Power Electronics | FC | 2 | | | 2 | 50 | 50 | 100 | BEEE |
| 2501EE13 | Electrical Measurements & Instrumentation | FC | 2 | 1 | 1 | 4 | 50 | 50 | 100 | ENA-1/BEEE |
| 2501EE53 | Electric Power Generation, Transmission and Distribution Systems | IC | 3 | | | 3 | 50 | 50 | 100 | ENA-1/BEEE |
| 2501EE34 | Alternative Energy Sources (or) | IC | 3 | | | 3 | 50 | 50 | 100 | EPGDS / BEEE/ ISM |
| 2501EE27 | Utilization of Electrical Energy | | | | | | | | | |
| 2501EE37 | Hybrid Electric Vehicles (or) | AC | 3 | | | 3 | 50 | 50 | 100 | FPE/ OCEM |
| 2501EE35 | Special Electric machines | | | | | | | | | |
| 2501EE43 | Electrical Safety (or) | AC | 3 | | | 3 | 50 | 50 | 100 | EPGDS /PSA |
| 2501EE30 | Methods & Algorithms for Intelligent Control | | | | | | | | | |
| Total | | | 18 | 1 | 1 | 20 | | | | |

Minor Degree in Mechanical Engineering

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|----------|---|-----------|-----|-----|-------|---------------|
| 2501ME74 | Basic Mechanical Engineering | FC | 2 | | | 2 | 50 | 50 | 100 | - |
| 2501ME04 | Engineering Thermodynamics | IC | 2 | 1 | | 3 | 50 | 50 | 100 | SSP/ MP |
| 2501ME77 | Introduction to Automobile Engineering (or) | IC | 3 | | | 3 | 50 | 50 | 100 | SSP/ MP |
| 2501ME78 | Mechanics of Solids | | | | | | | | | |
| 2501ME12 | Heat Power Engineering (or) | IC | 2 | 1 | | 3 | 50 | 50 | 100 | ETD |
| 2501ME40 | Refrigeration & Air Conditioning | | | | | | | | | |
| 2501ME75 | Production Technology | IC | 3 | | | 3 | 50 | 50 | 100 | EW |
| 2501ME76 | Metallurgy & Material Science | IC | 3 | | | 3 | 50 | 50 | 100 | SSP/ MP |
| 2501ME79 | Theory of Machines (or) | AC | 3 | | | 3 | 50 | 50 | 100 | SSP/ MP |
| 2501ME80 | Advanced Engineering Metrology | | | | | | | | | |
| Total | | | 18 | 2 | | 20 | | | | |

Minor Degree in Computer Science and Engineering

| Course Code | Course Title | Level | L | T | P | C | CIE | SE E | Total | Pre-requisite |
|--------------|--|-------|-----------|---|----------|-----------|-----|------|-------|---------------|
| 2501CS13 | Operating Systems | IC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501CS07 | Computer Networks | IC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501IT07 | Agile Software Engineering | IC | 2 | | 1 | 3 | 50 | 50 | 100 | PPSC |
| 2501AI03 | Data Mining | IC | 1 | | 2 | 3 | 50 | 50 | 100 | - |
| 2501CS08 | Object Oriented Programming through C++ (or) | IC | 2 | | 2 | 4 | 50 | 50 | 100 | PPSC |
| 2501IT06 | Java Programming | | | | | | | | | |
| 2501CS16 | Introduction to MERN Stack Development(or) | IC | | | 2 | 2 | 50 | 50 | 100 | JP |
| 2501CS30 | Information Security Analysis & Audit | IC | 2 | | | 2 | 50 | 50 | 100 | - |
| 2501CS18 | Advanced MERN Stack Development(or) | AC | | | 2 | 2 | 50 | 50 | 100 | IMSD |
| 2501IT12 | Flutter Fundamentals | AC | | | 2 | 2 | 50 | 50 | 100 | - |
| Total | | | 11 | | 9 | 20 | | | | |

Minor Degree in Data Science

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|---|----------|-----------|-----|-----|-------|---------------|
| 2501IT07 | Agile Software Engineering | IC | 2 | | 1 | 3 | 50 | 50 | 100 | PPSC |
| 2501CS34 | Fundamentals of Data Science | IC | 2 | | 1 | 3 | 50 | 50 | 100 | PPSC |
| 2501CS12 | NoSQL Databases | IC | 2 | | | 2 | 50 | 50 | 100 | - |
| 2501AI03 | Data Mining | IC | 1 | | 2 | 3 | 50 | 50 | 100 | - |
| 2501CS37 | Health Care Data Analytics | IC | 2 | | 1 | 3 | 50 | 50 | 100 | PPSC |
| 2501CS36 | (or) Business Intelligence & Analytics | | | | | | | | | |
| 2501AI04 | Big Data Analytics (or) | AC | 2 | | 1 | 3 | 50 | 50 | 100 | DM |
| 2501AI19 | Data Visualization | | | | | | | | | DAP |
| 2501CS41 | Social Network Analysis (or) | AC | 2 | | 1 | 3 | 50 | 50 | 100 | - |
| 2501CS40 | Social Networks & Semantic Web | | | | | | | | | |
| Total | | | 13 | | 7 | 20 | | | | |

Minor Degree in Artificial Intelligence and Machine Learning

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|---|----------|-----------|-----|-----|-------|---------------|
| 2501AI02 | Artificial Intelligence | IC | 2 | | 1 | 3 | 50 | 50 | 100 | DAP |
| 2501AI05 | Machine Learning | IC | 2 | | 2 | 4 | 50 | 50 | 100 | DAP |
| 2501AI15 | AI Chatbots | IC | 2 | | | 2 | 50 | 50 | 100 | DAP |
| 2501AI14 | Soft Computing (or) Fundamentals of Data Science | IC | 1 | | 2 | 3 | 50 | 50 | 100 | AI |
| 2501CS34 | | | 2 | | 1 | 3 | 50 | 50 | 100 | PPSC |
| 2501AI10 | Natural Language Processing (or) Data Visualization | AC | 2 | | 1 | 3 | 50 | 50 | 100 | DAP |
| 2501AI19 | | | | | | | | | | |
| 2501AI16 | Prompt Engineering and GenAI (or) Social Network Analysis | AC | 2 | | 1 | 3 | 50 | 50 | 100 | ML |
| 2501CS41 | | | | | | | | | | |
| 2501AI17 | Federated Machine Learning | AC | 2 | | | 2 | 50 | 50 | 100 | ML |
| TOTAL | | | 14 | | 6 | 20 | | | | |

Minor Degree in Petroleum Technology

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|----------|---|-----------|-----|-----|-------|---------------|
| 2501PT27 | Introduction to Petroleum Engineering | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501PT35 | Unit Operations in Petroleum Industry | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501PT47 | Fundamentals of Geology & Reservoir Engineering | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501PT48 | Fundamentals of Drilling & Production Engineering (or) Unconventional Hydrocarbon Resources | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501PT16 | | | 1 | 1 | 2 | | | | | |
| 2501PT49 | Natural Gas Hydrates (or) Fundamentals of Liquefied Natural Gas | AC | 2 | | | 2 | 50 | 50 | 100 | - |
| 2501PT05 | | | 3 | | 3 | | | | | |
| 2501PT50 | Artificial Lift Techniques (or) Enhanced Oil Recovery | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501PT03 | | | 2 | 1 | 3 | | | | | |
| 2501PT12 | Petroleum Refinery Engineering | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| Total | | | 18 | 2 | | 20 | | | | |

Minor Degree in Mining Engineering

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|--|-------|-----------|---|---|-----------|-----|-----|-------|---------------|
| 2501MN003 | Development of Mineral Deposits | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MN41 | Green Mining | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MN06 | Surface Mining | IC | 3 | | | 3 | 50 | 50 | 100 | DMD |
| 2501MN24 | Drilling & Blasting | IC | 3 | | | 3 | 50 | 50 | 100 | DMD |
| 2501MN07 | Underground Coal Mining Technology | IC | 3 | | | 3 | 50 | 50 | 100 | DMD |
| 2501MN08 | Underground Metal Mining Technology | | | | | | | | | |
| 2501MN14 | Mine Legislation & General Safety (or) | AC | 3 | | | 3 | 50 | 50 | 100 | UCMT / UMMT |
| 2501MN28 | Environmental Pollution & Control | | | | | | | | | |
| 2501MN45 | Industrial Safety Practices (or) | AC | 2 | | | 2 | 50 | 50 | 100 | - |
| 2501MN46 | Ground Control | | | | | | | | | |
| Total | | | 20 | | | 20 | | | | |

Minor Degree in Agricultural Engineering

| Agricultural Engineering | | | | | | | Marks | | | Pre-requisite |
|--------------------------|--|-------|-----------|---|---|-----------|-------|-----|-------|---------------|
| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | |
| 2501AE82 | Fundamentals of Renewable Energy Sources | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501AE83 | Post-harvest Engineering of Cereal Crops | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501AE84 | Ground Water Hydrology | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501AE85 | Micro Irrigation Systems | IC | 2 | | | 2 | 50 | 50 | 100 | - |
| 2501AE86 | Surface Water Hydrology (OR) | IC | 3 | | | 3 | 50 | 50 | 100 | GWH |
| 2501AE87 | Land & Water Management Engineering | | | | | | | | | |
| 2501AE88 | Agricultural Process Engineering & Food Quality (OR) | AC | 3 | | | 3 | 50 | 50 | 100 | PHECC |
| 2501AE89 | Post-harvest Engineering for Horticultural Products | | | | | | | | | |
| 2501AE90 | Agricultural & Machinery Equipment | AC | 3 | 0 | 0 | 3 | 50 | 50 | 100 | FRES |
| 2501AE91 | (or) Design of Bio-energy systems | | | | | | | | | |
| Total | | | 20 | | | 20 | | | | |

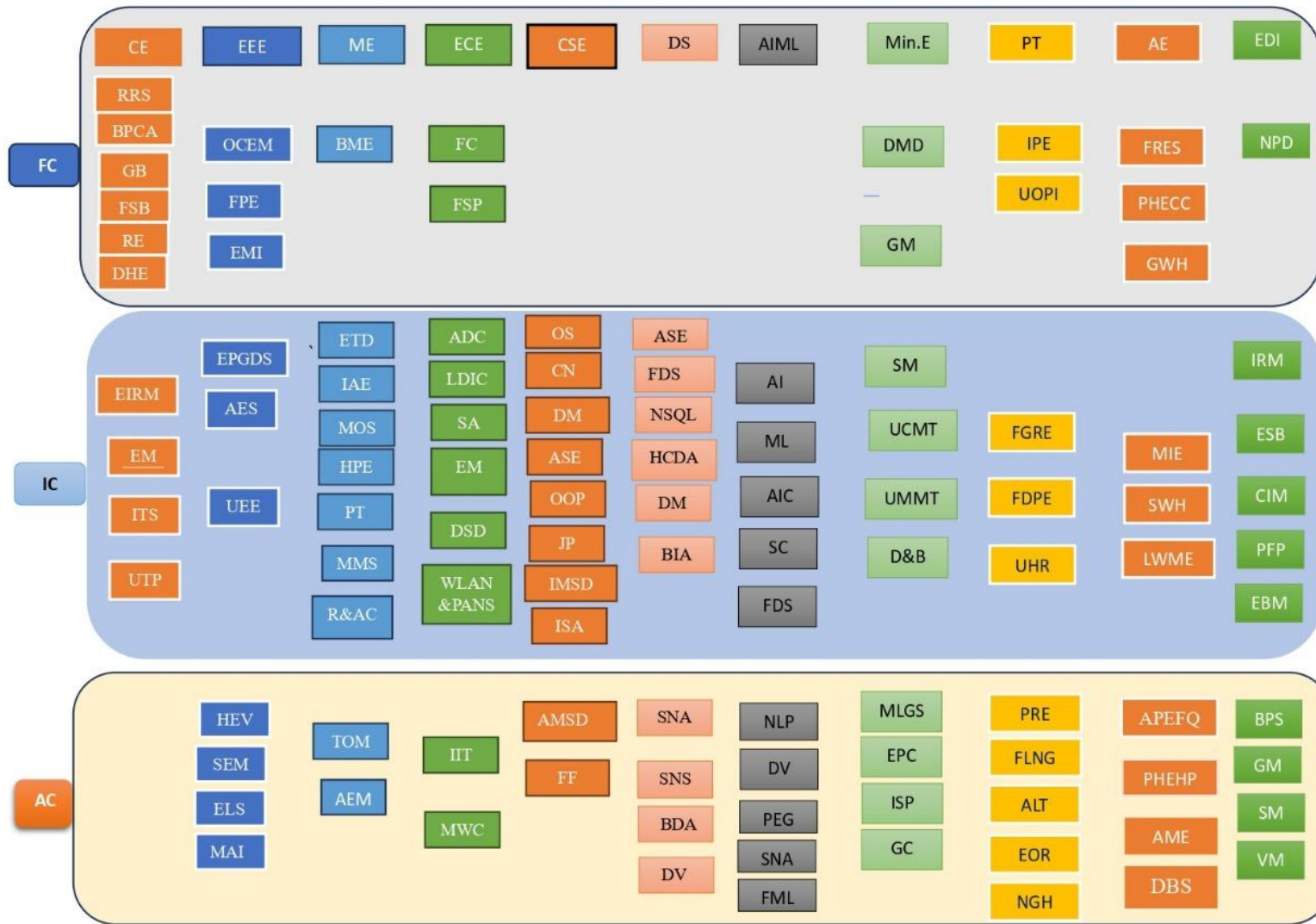
Minor Degree in Entrepreneurship Development & Incubation

| Course Code | Course Name | Level | L | T | P | C | CIE | SEE | Total | Pre-requisite |
|--------------|---|-------|-----------|---|---|-----------|-----|-----|-------|---------------|
| 2501MB07 | New Product Development | FC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MB08 | Entrepreneurship & Small Business Management | IC | 2 | | | 2 | 50 | 50 | 100 | - |
| 2501MB09 | Insurance & Risk Management | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MB10 | Change & Innovations Management | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MB11 | Personal Financial Planning (or) E-Business management | IC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MB12 | | | | | | | | | | |
| 2501MB13 | Business Policy & Strategic Management (or) Green Marketing | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MB14 | | | | | | | | | | |
| 2501MB15 | Startup Management (or) Venture Management | AC | 3 | | | 3 | 50 | 50 | 100 | - |
| 2501MB16 | | | | | | | | | | |
| Total | | | 20 | | | 20 | | | | |

Minor Degree in Quantum Technologies

| S.No. | Course Code | Course Name | L | T | P | C | Semester |
|--------------------------------------|-------------|--|-------------------------------|----------|----------|-----------|----------|
| Mandatory Courses | | | | | | | |
| 1 | 251EC097 | Survey of Quantum technologies and Application | 3 | 0 | 0 | 3 | IV |
| 2 | 251EC098 | Foundations of Quantum Technologies | 3 | 0 | 0 | 3 | V |
| 3 | 251EC099 | Basic Programming Lab (or) | 1 | 0 | 2 | 3 | V |
| | 251EC100 | Basic Laboratory Course for Quantum Technologies | | | | | |
| 4 | 251EC101 | Quantum Algorithms and Cryptography | 12 week 3 Credit - NPTEL MOOC | | | 3 | VII/VIII |
| Any One course from the below | | | | | | | |
| 5 | 251EC102 | Introduction to Quantum Computation | 3 | 0 | 0 | 3 | VI |
| 6 | 251EC103 | Introduction to Quantum Communication | 3 | 0 | 0 | 3 | VI |
| 7 | 251EC104 | Introduction to Quantum Sensing | 3 | 0 | 0 | 3 | VI |
| 8 | 251EC105 | Introduction to Quantum Materials | 3 | 0 | 0 | 3 | VI |
| Any One course from the below | | | | | | | |
| 9 | 251EC106 | Engineering Foundations of Quantum Technologies | 3 | 0 | 0 | 3 | VII |
| 10 | 251EC107 | Solid State Physics for Quantum Technologies | 3 | 0 | 0 | 3 | VII |
| 11 | 251EC108 | Quantum Optics | 3 | 0 | 0 | 3 | VII |
| 12 | 251EC109 | Quantum Cybersecurity | 3 | 0 | 0 | 3 | VII |
| 13 | 251EC110 | Quantum Machine Learning | 3 | 0 | 0 | 3 | VII |
| Total | | | 18 | 0 | 0 | 18 | |

Minor Degree Pre-requisite Flow Chart



| Dept. | FOUNDATION COURSE | INTERMEDIATE- LEVEL COURSE | ADVANCED COURSE | |
|-------|-------------------|--|-----------------|--|
| CE | RRS | Repair & Rehabilitation of Structures | EIRM | Environmental Impact & Risk Management |
| | BPCA | Building Planning & Computer-Aided Drawing | EM | Environmental Management |
| | GB | Green Building | UTP | Urban Transportation Planning |
| | FSB | Fundamental of Soil Behaviour | ITS | Intelligent Transportation Systems |
| | RE | Railway Engineering | | |
| EEE | DHE | Docks & Harbour Engineering | | |
| | OCEM | Operation control of Electric Machines | AES | Alternative Energy Sources |
| EEE | FPE | Fundamentals of Power Electronics | EPGD S | Electric Power Generation & Distribution Systems |
| | EMI | Electrical Measurements & Instrumentation | UEE | Utilization of Electrical Energy |
| ME | BME | Basic Mechanical Engineering | ETD | Engineering Thermodynamics |
| | | | IAE | Introduction to Automobile Engineering |
| | | | MOS | Mechanics of Solids |
| | | | HPE | Heat Power Engineering |
| | | | PT | Production Technology |
| | | | MMS | Metallurgy & Material Science |
| | | | R&AC | Refrigeration & Air Conditioning |
| ECE | FC | Fundamentals of Communications | ADC | Analog & Digital Circuits |
| | FSP | Fundamentals of Signal Processing | LDIC SA | Linear & Digital IC Applications Sensors & Actuators |
| | | | EM | Embedded Microcontrollers |
| CSE | | | DSD | Digital System Design |
| | | | WLAN & PAN | Wireless LANS & PANS |
| | | | SE | Software Engineering |
| | | | OOP | Object Oriented Programming through C++ |
| | | | OS | Operating Systems |
| | | | CN | Computer Networks |
| | | | JP | Java Programming |
| | | | IMSD | Introduction to MERN Stack Development |
| | | | ISA | Information Security Analysis and Audit |
| | | | DM | Data Mining |
| DS | | | DM | Data Mining |
| | | | FDS | Fundamentals of Data Science |
| | | | SE | Software Engineering |
| | | | NSQL | NoSQL Databases |
| | | | MAI | Methods & Algorithms for Intelligent Control |
| | | | HEV | Hybrid Electric Vehicles |
| | | | SEM | Special Electric Machines |
| | | | ELS | Electrical Safety |
| | | | TOM | Theory of Machines |
| | | | AEM | Advanced Engineering Metrology |
| | | | IIT | Introduction to Internet of things |
| | | | MWC | Modern Wireless Communications |
| | | | AMSD | Advanced MERN Stack Development |
| | | | FF | Flutter Fundamentals |
| | | | SNA | Social Network Analysis |
| | | | DV | Data Visualization |
| | | | BDA | Big Data Analytics |
| | | | SNSW | Social Networks and Semantic Web |

| | | | | | | |
|--------------|------|--|------|---|-------|--|
| | | | BIA | Business Intelligence & Analytics | | |
| | | | HCDA | Health Care Data Analysis | | |
| | | | ML | Machine Learning | DV | Data Visualization |
| | | | AI | Artificial Intelligence | PEG | Prompt Engineering and GenAI |
| AIML | | | AI C | AI Chatbot | SNA | Social Network Analysis |
| | | | FDS | Fundamentals of Data Science | FML | Federated Machine Learning |
| | | | SC | Soft Computing | NLP | Natural Language Processing |
| | DMD | Development of Mineral Deposits | SM | Surface Mining | MLGS | Mine Legislation and General Safety |
| Min.E | GM | Green Mining | UCMT | Underground Coal Mining Technology | EPC | Environmental Pollution & Control |
| | | | UMMT | Underground Metal Mining Technology | ISP | Industrial Safety Practices |
| | | | DB | Drilling & Blasting | GC | Ground Control |
| | IPE | Introduction to Petroleum Engineering | FGRE | Fundamentals of Geology and Reservoir Engineering | PRE | Petroleum Refinery Engineering |
| PT | UOPI | Unit operations in Petroleum Industry | FDPE | Fundamentals of Drilling and Production Engineering | FLNG | Fundamentals of Liquefied Natural Gas |
| | | | UHR | Unconventional Hydrocarbon Resources | NGH | Natural Gas Hydrates |
| | GWH | Ground Water Hydrology | LWME | Land and Water Management | ALT | Artificial Lift Techniques |
| | PHEC | Post-harvest Engineering of Cereal Crops | SWH | Surface Water Hydrology | EOR | Enhanced Oil Recovery |
| Ag.E | | | MIE | Micro Irrigation Systems | DBS | Design of Bio-Energy Systems |
| | | | | | PHEHP | Post-Harvest Engineering for Horticultural Produce |
| | FRES | Fundamentals of Renewable Energy Sources | | | AME | Agricultural Machinery and Equipment |
| | | | | | | Agriculture Process Engineering and Food Quality |
| | NPD | New Product Development | ESB | Entrepreneurship and Small Business Management | APEFQ | Engineering and Food Quality |
| EDC | | | | | BPS | Business Policy & Strategic Management |
| | | | CIM | Change & Innovations Management | GM | Green Marketing |
| | | | PFM | Personal Financial Planning | SM | Startup Management |
| | | | EBM | E-Business Management | VM | Venture Management |
| | | | IRM | Insurance and Risk Management | | |