PROGRAM CURRICULUM

ELECTRONICS AND COMMUNICATION ENGINEERING

for

B. TECH. FOUR YEAR DEGREE PROGRAM

(Applicable for the batches admitted from A.Y 2024-25)

ADITYA UNIVERSITY

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.

ADITYA UNIVERSITY

Department Electronics and Communication Engineering

B. Tech (ECE) Program Curriculum -2024

(Applicable for the Batches admitted from A.Y 2024-25)

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 Streamin 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	09
5	Skill Enhancement Courses (SEC)	9	10
6	Value Added Courses (VAC)	6-8	06
7	Summer Internships (SI)	2-4	04
8	Full Semester Internship (or) Project (PROJ)	12	10
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	SEE	Total	Pre-requisite
241MA001	Linear Algebra & Calculus	FC	2	1		3	50	50	100	-
241MA002	Differential Equations & Vector Calculus	FC	2	1		3	50	50	100	-
241MA007	Transform Calculus	FC	2	1		3	50	50	100	LAC, DEVC
241CH002	Applied Chemistry	FC	2		1	3	50	50	100	-
241PH002	Modern Physics	FC	2		1	3	50	50	100	-
241CS001	Programming for Problem Solving Using C	FC	2		2	4	50	50	100	-
241IT001	IT & AI Skills	FC			2	2	50	50	100	-
241ME001	Engineering Graphics	FC	1		2	3	50	50	100	-
241ME003	Engineering Workshop	FC			1	1	100	-	100	-
241EE001	Basic Electrical & Electronics Engineering	FC	2		2	4	50	50	100	-
241EC002	Network Analysis	FC	3	1		4	50	50	100	-
241EC001	Digital Electronics & Logic Design	FC	2		2	4	50	50	100	-
241EC003	Electronic Devices & Circuits	FC	2		2	4	50	50	100	BEEE
241EC004	Random Variables & Stochastic Processes	FC	3	1		4	50	50	100	-
241EC014	Signals & Systems	FC	2		2	4	50	50	100	-
241EC005	Electromagnetic Waves & Transmission Lines	IC	2	1		3	50	50	100	DEVC
241EC006	Analog Electronics	IC	2		2	4	50	50	100	EDC

241EC007	Integrated Circuits & Applications	IC	2		2	4	50	50	100	EDC
241EC008	Linear Control Systems	IC	2	1		3	50	50	100	S&S
241EC009	Analog & Digital Communications	IC	2		2	4	50	50	100	S&S
241EC010	Digital Signal Processing	IC	2		1	3	50	50	100	S&S
241EC011	VLSI Design	IC	2		1	3	50	50	100	EDC
241EC012	Microprocessors & Microcontrollers	AC	2		1	3	50	50	100	DELD
241EC013	Antenna & Microwave Engineering	AC	2		2	4	50	50	100	EMTL
Total			**45**	**7**	**28**	**80**				

Multi-Disciplinary Courses (MDC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CS003	Data Structures	FC	2		2	4	50	50	100	PPSC
241MB002	Engineering Economics	FC	3			3	50	50	100	-
241MB003	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
241EN001	Essential Cognitive Skills for Engineers	FC			1	1	100	-	100	-
241EN002 241UC005 241UC004 241UC003 241UC006	Advanced Cognitive Skills for Engineers(or) Proficiency in Foreign Language Japanese / German /French/ Spanish	FC			1	1	100	-	100	-
241UC007	Design Thinking	FC			1	1	100	-	100	-
241UC008	Universal Human Values	FC	2			2	100	-	100	-
241UC009	Technical Paper Publication	AC			2	2	100	-	100	-
241EC096	Student Activity-Based Learning	AC				2				
Total			**2**		5	**9**				

Skill Enhancement Courses (SEC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EC021	PCB Design	FC			2	2	50	50	100	-
241EC094	Soft Computing Tools	IC			2	2	50	50	100	-
241EC015	Android Applications	AC			2	2	50	50	100	-
241EC016	ECAD Tools	AC			2	2	50	50	100	VLSI
241EC017	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
241UC010	Indian Cultural Heritage & Fine Arts	FC			1	1	100	-	100	-
241PE001	Sports &Yoga	FC			1	1	100	-	100	-
241CS004	Internet of Things	FC			1	1	100	-	100	-
241CS002	Data Analysis Using Python	IC			2	2	50	50	100	-
241UC011	Employability Skills-I	FC			3	0	100	-	100	-
241UC013	Employability Skills-II	FC			3	0	100	-	100	ES-I
241UC014	Employability Skills-III	IC			3	0	100	-	100	ES-II
241UC015	Employability Skills-IV	IC			3	0	100	-	100	ES-III
241UC016	Employability Skills-V	AC			3	1	100	-	100	ES-IV
Total					**20**	**6**				

Summer Internships (SI)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EC018	Summer Internship-I	IC			2	2	100	-	100	-
241EC019	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
241EC020	Full Semester Internship (or) Project	AC			10	10	50	50	100	-
Total					**10**	**10**				

Mandatory Courses (MC)

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241AC001	Environmental Science	FC	2			0	100	-	100	-
241AC002	Constitution of India	FC	2			0	100	-	100	-
241AC003	Research Methodology	FC	2			0	100	-	100	-
241AC004	Intellectual Property Rights & Patents	FC	2			0	100	-	100	-
241AC005	Indian Knowledge Systems (IKS)	FC	2			0	100	-	100	-
	Total		**10**			**0**				

Minor Stream: VLSI

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EC086	Digital System Design Through Verilog	IC	2		1	3	50	50	100	DELD
241EC022	Design for Testability	IC	3			3	50	50	100	DDTV
241EC023	CMOS Digital IC Design	IC	3			3	50	50	100	DELD
241EC030	Testing & Verification of VLSI Circuits	IC	3			3	50	50	100	VLSI, DFT
241EC024	Analog VLSI Design	IC	3			3	50	50	100	VLSI
241EC025	CMOS Mixed Signal IC Design	AC	2		1	3	50	50	100	CDICD, AVLSI
241EC028	Low Power VLSI Design	AC	3			3	50	50	100	VLSI
241EC027	FPGAs & ASIC Design	AC	3			3	50	50	100	DDTV
241EC029	SoC Design	AC	3			3	50	50	100	MPMC
241EC026	Digital Design Through System Verilog	AC	3			3	50	50	100	DDTV
241EC031	VLSI Physical Design	AC	2			2	50	50	100	LPVLSID
	Total		**30**		**2**	**32**				

Minor Stream: Embedded Systems

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EC038	Microcontrollers for Embedded Systems	IC	3			3	50	50	100	MPMC
241EC034	Embedded System Design	IC	2		1	3	50	50	100	-
241EC040	Programming Languages for Embedded System	IC	3			3	50	50	100	-
241EC042	Wireless LAN's & PAN's	IC	3			3	50	50	100	ESD
241EC039	Parallel Processing	IC	3			3	50	50	100	MPMC
241EC033	Embedded Computing	AC	2			2	50	50	100	ERTS
241EC032	Embedded & Real Time Systems	AC	3			3	50	50	100	ESD
241EC036	Hardware interfacing & Networking	AC	3			3	50	50	100	ESD
241EC035	Hardware & Software Co-Design	AC	3			3	50	50	100	ESD
241EC037	Internet of Things & its Applications	AC	2		1	3	50	50	100	-
241EC041	Smart Sensors & Devices for Agriculture	AC	3			3	50	50	100	IOTA
Total			**30**		**2**	**32**				

Minor Stream: Signal Processing and Communication Technology

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EC045	Fundamentals of Speech Processing	IC	2		1	3	50	50	100	S&S
241EC046	Information Theory & Coding Techniques	IC	2		1	3	50	50	100	-
241EC044	Digital Signal Processors & Architectures	IC	3			3	50	50	100	DSP
241EC043	Digital Image Processing	IC	2		1	3	50	50	100	S&S
241EC049	Radar Engineering	IC	3			3	50	50	100	ADCM
241EC051	Soft Computing Techniques	AC	3			3	50	50	100	-
241EC047	Optical Communications	AC	3			3	50	50	100	ADCM
241EC050	Satellite Communications	AC	3			3	50	50	100	ADCM
241EC048	Pattern Recognition	AC	2			2	50	50	100	DIP
241EC052	Wireless Communications	AC	3			3	50	50	100	ADCM
241EC053	Wireless Sensor Networks	AC	3			3	50	50	100	IOT
Total			**29**		**3**	**32**				

Minor Stream: Space Technology

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EC054	Introduction to Space Laws	IC	3			3	50	50	100	-
241EC055	Aircraft Communication Systems	IC	3			3	50	50	100	-
241EC057	Aircraft Navigation Systems	IC	3			3	50	50	100	-
241EC062	Missile & Space Vehicle Guidance & Control	IC	2			2	50	50	100	-
241EC060	Flight Control Systems	IC	3			3	50	50	100	-
241EC058	Avionics Embedded Systems	IC	3			3	50	50	100	-
241EC059	Avionics Network Technology	AC	3			3	50	50	100	-
241EC064	Unmanned Aircraft Systems	AC	3			3	50	50	100	-
241EC056	Aerospace Electromagnetic Compatibility	AC	3			3	50	50	100	-
241EC061	Global Navigation Satellite Systems & Applications	AC	3			3	50	50	100	SC
241EC063	Remote Sensing & Digital Image Processing of Satellite Data	AC	3			3	50	50	100	DIP
Total			**32**			**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
241EC066	Software Defined Radio	IC	3	1		4	50	50	100	-
241EC067	Introduction to Internet of Things	IC	2		1	3	50	50	100	-
241EC068	Cloud based Internet of Things	IC	2		2	4	50	50	100	IIoT
241EC069	Cyber Defence & Information Security	IC	3			3	50	50	100	-
241EC070	Industrial Applications of Microcontrollers - A Practice based approach	IC	3			3	50	50	100	-
241EC065	Applied Industrial IoT	IC	3			3	50	50	100	-
241EC071	Data Engineering, Analytics & Security in Industries	AC	3			3	50	50	100	-
241EC072	Cloud Adoption & Management Techniques	AC	3			3	50	50	100	-
241EC073	Artificial Intelligence & Edge Computing	AC	3			3	50	50	100	-
241EC074	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
241EC075	Digital Data Communications	IC	3		1	4	50	50	100	-
241EC076	Introduction to Machine Learning	IC	3		1	4	50	50	100	-
241EC077	Sensors & Transducers	IC	3			3	50	50	100	-
241EC078	Cyber Physical Systems for Industrial Applications	IC	3			3	50	50	100	-
241EC065	Applied Industrial IoT	IC	3			3	50	50	100	-
241EC079	Drone Technology and its Transformative Applications- A Practitioner's Perspective	IC	3			3	50	50	100	-
241EC073	Artificial Intelligence and Edge Computing	AC	3			3	50	50	100	-
241EC080	5G Technology for Smarter & Secure Connectivity	AC	3			3	50	50	100	-
241EC074	Modern Wireless Communications	AC	3			3	50	50	100	-
241EC081	Chip based VLSI Design for Industrial Applications	AC	3			3	50	50	100	-
Total			**30**		**2**	**32**				

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UNIVERSITY OPEN ELECTIVE COURSES

AI & ML

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Offered to Programs	Pre-requisite
241AI002	Artificial Intelligence	FC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241AI005	Machine Learning	FC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI027	AI & Data Science	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI028	AI in Healthcare	IC	2		1	3	50	50	100	CE,EEE, ME, ECE,CSE, IT, AIML,CSE (DS) PT,Min.E	DAP
241AI011	Deep Learning	IC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI010	Natural Language Processing	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI009	Reinforcement Learning	AC	1		2	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	DAP
241AI029	AI in Agriculture	AC	2		1	3	50	50	100	CE,EEE,ME, ECE,CSE,IT, AIML,CSE(DS) PT,Min.E	DAP
241AI030	Robotics & AI	AC	2		1	3	50	50	100	CE,EEE,ME, ECE,CSE,IT, AIML,CSE(DS) PT,Min.E	DAP
241AI031	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**
241ME081	Fundamentals of Production Excellence	FC	2			2	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT,Min.E	-
241ME082	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
241ME083	Quality Excellence in Production	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME084	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
241ME085	Agile Production Systems	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME086	Process Excellence & Optimization	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	FPE
241ME087	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
241ME088	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
241ME089	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
241ME058	Industry 5.0 for Engineers	AC	3			3	50	50	100	CE,EEE, ECE, CSE,IT, AIML, CSE(DS) PT,MinE	FPE

241ME090	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**
241MB017	Introduction to Supply Chain Management	FC	2			2	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT,Min.E	-
241MB018	Logistics & Distribution Management	FC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB019	Supply Chain Project Management	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB020	Supply Chain Innovation &Trends	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB021	Supply Chain Analytics	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB022	Demand Planning & Forecasting	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB023	Supply Chain Risk Management	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM

241MB024	Inventory Management & Control	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB025	E-Commerce & Supply Chain Management	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB026	Operations Management	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	ISCM
241MB027	Supply Chain Ethics & Corporate Social Responsibility (CSR)	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(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**
241CE074	Introduction to Sustainable Development	FC	2			2	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML,CSE(DS) PT,Min.E	-
241CE079	Natural Disaster Management & Mitigation	FC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE081	Waste Water Management	IC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE082	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	-
241CE083	Watershed Management	IC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-

241EE033	Energy Audit, Conservation & Management	IC	3			3	50	50	100	CE, ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241EE006	Electric Power Generation, Transmission & Distribution Systems	AC	3			3	50	50	100	CE, ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241CE075	Sustainable Agriculture & Food Systems	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE076	Sustainable Supply Chain Management	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE077	Sustainable Production Excellence	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241CE078	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**					

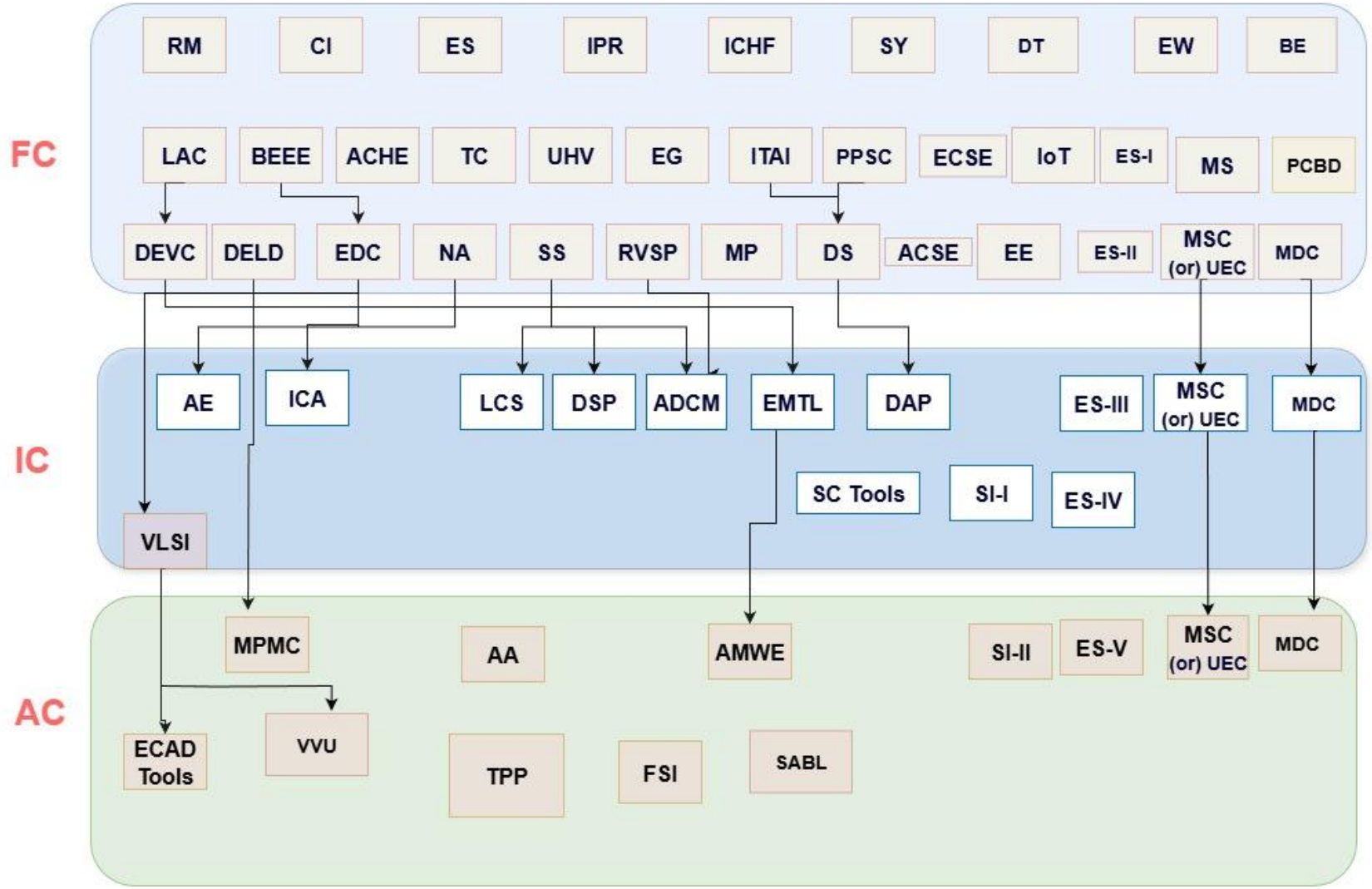
Security											
Course Code	**Course Name**	**Level**	**L**	**T**	**P**	**C**	**CIE**	**SEE**	**Total**	**Offered to Programs**	**Pre-requisite**
241CS032	Cybersecurity Essentials	FC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT035	Security in Software Development	FC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS028	Ethical Hacking	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS069	Cloud Security	IC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT036	Security &Compliance in Business	IC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT037	Cryptography & Data Security	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT038	Security Awareness & Social Engineering	AC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT039	Cybersecurity Policy & Strategy	AC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT040	Security in Emerging Technologies	AC	3			3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS030	Information Security Analysis & Audit	AC	2			2	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT041	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**
241CE080	Remote Sensing & GIS Applications	FC	3			3	50	50	100	EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241EE036	Electric Energy Storage Systems	FC	3			3	50	50	100	CE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241EE043	Electrical safety	IC	3			3	50	50	100	CE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241EE054	Hybrid & Electric Vehicles	IC	3			3	50	50	100	CE, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241ME073	Organizational Behaviour	FC	3			3	50	50	100	CE,EEE, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241ME036	Sustainable Energy Systems	FC	3			3	50	50	100	CE, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241ME037	Solar Energy Systems	FC	3			3	50	50	100	CE,EEE,ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241ME060	Composite Materials	IC	3			3	50	50	100	CE,EEE,ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	SSP/MP
241EC082	Communication Systems	FC	3			3	50	50	100	CE,EEE,ME,CSE ,IT, AIML, CSE(DS) PT,Min.E	-
241EC083	Electronic Measurements & Instrumentation	FC	3			3	50	50	100	CE,EEE,ME, CSE,IT, AIML, CSE(DS) PT,Min.E	BEEE
241EC084	Introduction to Embedded Systems	FC	3			3	50	50	100	CE,EEE,ME, CSE,IT, AIML, CSE(DS) PT,Min.E	-

241EC085	Fundamentals of Image Processing	FC	3			3	50	50	100	CE,EEE,ME, CSE,IT, AIML, CSE(DS) PT,Min.E	
241EC077	Sensors and Transducers	IC	3			3	50	50	100	CE,EEE,ME, CSE,IT, AIML, CSE(DS) PT,Min.E	
241CS003	Data Structures	FC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	PPSC
241CS065	Computer Organization	FC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS013	Operating Systems	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT005	Database Management Systems	IC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	PPSC
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	PPSC
241CS007	Computer Networks	IC	2		1	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT006	Java Programming	IC	2		2	4	50	50	100	CE,EEE,ME, ECE, PT,Min.E	PPSC
241CS068	Fundamentals of RedHat Enterprise Linux	FC			2	2	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS067	AWS Cloud Foundations	IC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS066	AWS Cloud Development	AC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241CS070	Continuous integration & delivery using DevOps	AC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT024	Fundamentals of Salesforce Administration	FC			2	2	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT034	Advanced Salesforce Administration	AC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT023	Principles of Pega Systems	IC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241IT026	Pega System Architecture & Design	AC			3	3	50	50	100	CE,EEE,ME, ECE, PT,Min.E	-
241MB004	Entrepreneurship Development & Incubation	IC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-

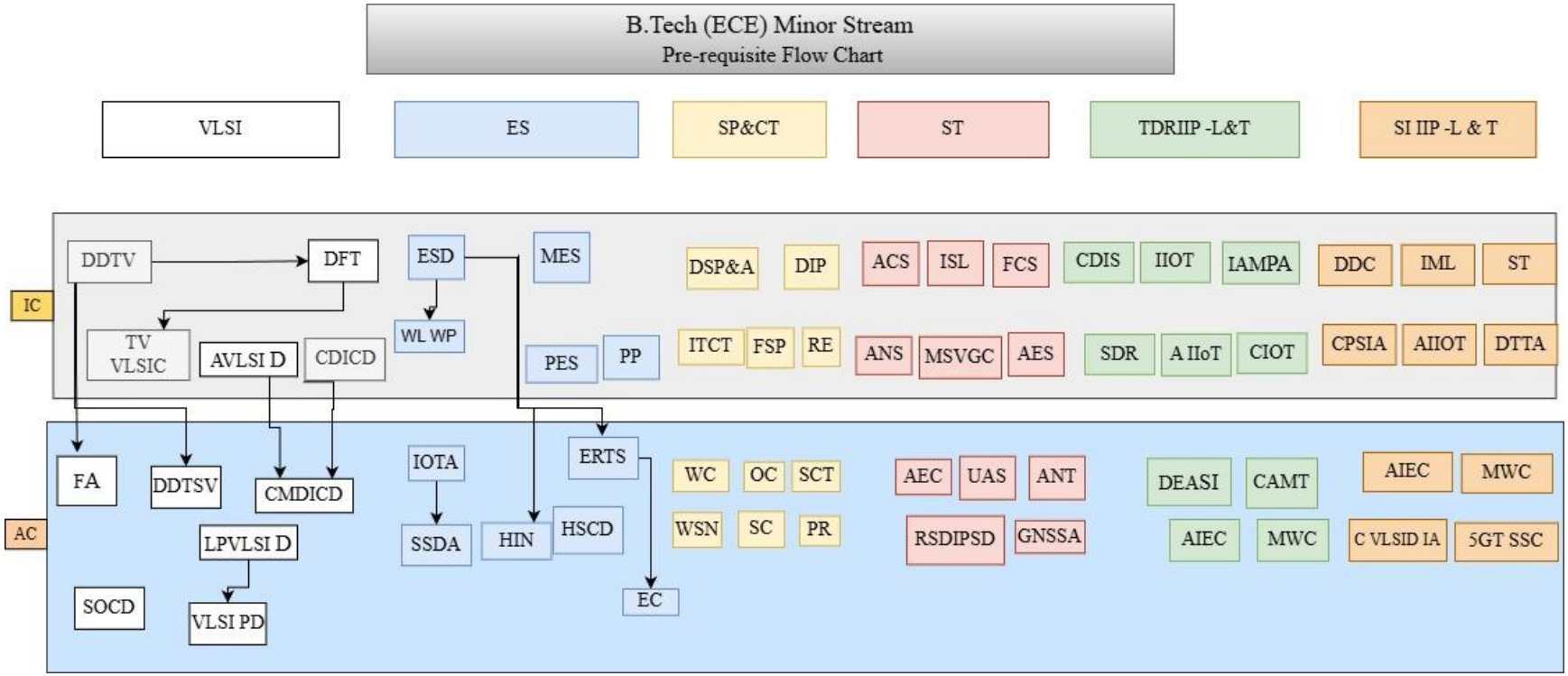
241MB005	Business Ethics & Corporate Governance	AC	3			3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241MB006	Entrepreneurship Development & Business Management	AC	1		2	3	50	50	100	CE,EEE,ME, ECE, CSE,IT, AIML, CSE(DS) PT,Min.E	-
241EC029	SoC Design	AC	3			3	50	50	100	CE, EEE, ME, CSE, IT, AIML, CSE (DS), PT, Min.E.	MPMC
241CS023	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	MPMC	Microprocessors & Microcontrollers
DEVC	Differential Equations & Vector Calculus	AE	Analog Electronics	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	ADCM	Analog & Digital Communications	ECAD	ECAD Tools
PPSC	Programming for Problem Solving Using C	DSP	Digital Signal Processing	VVU	Verification using Verilog & UVM
ITAI	IT & AI Skills	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		
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 (or)Proficiency in Foreign Language (Japanese/German /French/Spanish)				
DT	Design Thinking				
UHV	Universal Human Values				
ICHF	Indian Cultural Heritage & fine arts				
SY	Sports &Yoga				
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	Indian Knowledge Systems


B.Tech (ECE) Minor Stream
Pre-requisite Flow Chart
VLSI
ES
SP&CT
ST
TDRIIP -L&T
SI IIP -L & T
IC
DDTV
DFT
ESD
MES
DSP&A
DIP
ACS
ISL
FCS
CDIS
IIOT
IAMPA
DDC
IML
ST
TV VLSIC
AVLSI D
CDICD
WL WP
PES
PP
ITCT
FSP
RE
ANS
MSVGC
AES
SDR
A IIoT
CIOT
CPSIA
AIIOT
DTTA
AC
FA
DDTSV
CMDICD
IOTA
ERTS
WC
OC
SCT
AEC
UAS
ANT
DEASI
CAMT
AIEC
MWC
LPVLSI D
SSDA
HIN
HSCD
WSN
SC
PR
RSDIPSD
GNSSA
AIEC
MWC
C VLSID IA
5GT SSC
SOCD
VLSI PD
EC

	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
	CDICD	CMOS Digital IC Design	FA	FPGAs & ASIC Design
	TVVLSI	Testing & Verification of VLSI Circuits	SoCD	SoC design
	AVLSI	Analog VLSI Design	DDTSV	Digital System Design Through System Verilog
			VLSIPD	VLSI Physical System Design
Embedded Systems-ES	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
	WLWP	Wireless LAN's & PAN's	HIN	Hardware interfacing & Networking
	PP	Parallel Processing	EC	Embedded Computing
			IOTA	Internet of Things & its Applications.
Signal Processing and Communication Technology-ST&CT	FSP	Fundamentals of Speech Processing	SCT	Soft Computing Techniques
	ITCT	Information Theory & Coding Techniques	OC	Optical Communications
	DSPA	Digital Signal Processors & Architectures	SC	Satellite Communications
	RE	Radar Engineering	WC	Wireless Communications
	DIP	Digital Image Processing	WSN	Wireless Sensor Networks
			PR	Pattern Recognition
Space Technology-ST	ISL	Introduction to Space Laws	ANS	Avionics Technology
	ACS	Aircraft Communication Systems	GNSSA	Global Navigation Satellite Systems & Applications
	ANS	Aircraft Navigation Systems	UAS	Unmanned Aircraft System
	MSVGC	Missile & Space Vehicle Guidance and Control	AEC	Aerospace Electromagnetic Compatibility
	FCS	Flight Control System	RSDIPSD	Remote Sensing & Digital Image Processing of Satellite Data
	AEC	Avionics Embedded System		
Technology for Digital Resilience Industry Integrated Program- L & T-TDRIIP-L&T	CDIS	Cyber Defence & Information Security	DEASI	Data Engineering, Analytics & Security in Industries
	IAMPA	Industrial Applications of Microcontrollers - A Practice based approach	CAMT	Cloud Adoption & Management Techniques
	AIIoT	Applied Industrial IoT	AIEC	Artificial Intelligence & Edge Computing
	SDR	Software Defined Radio	IioT	Introduction to Internet of things

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
	DTTA	Drone Technology and its Transformative Applications -A Practitioner's Perspective	CVLSIIA	Chip based VLSI Design for Industrial Applications
	DDC	Digital Data Communication		
	IML	Introduction to Machine Learning		
	S&T	Sensors &Transducers		

Suggestive Semester-wise Curriculum

I SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA001	Linear Algebra & Calculus	MCC	FC	2	1		3	3
241PH002	Modern Physics	MCC	FC	2		1	3	4
241CS001	Programming for Problem Solving Using C	MCC	FC	2		2	4	6
241EE001	Basic Electrical & Electronics Engineering	MCC	FC	2		2	4	6
241IT001	IT & AI Skills	MCC	FC			2	2	4
241EN001	Essential Cognitive Skills for Engineers	AEC	FC			1	1	2
241UC008	Universal Human Values	AEC	FC	2			2	2
241PE001	Sports &Yoga	VAC	FC			1	1	2
	Total			**10**	**1**	**9**	**20**	**29**

II SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA002	Differential Equations & Vector Calculus	MCC	FC	2	1		3	3
241CH002	Applied Chemistry	MCC	FC	2		1	3	4
241ME001	Engineering Graphics	MCC	FC	1		2	3	5
241EC002	Network Analysis	MCC	FC	3	1		4	4
241ME003	Engineering Workshop	MCC	FC			1	1	2
241CS003	Data Structures	MDC	FC	2		2	4	6
241EN002 241UC005 241UC004 241UC003 241UC006	Advanced Cognitive Skills for Engineers(or) Proficiency in Foreign Language Japanese / German /French/ Spanish	AEC	FC			1	1	2
241UC007	Design Thinking	AEC	FC			1	1	2
241UC010	Indian Cultural Heritage & Fine Arts	VAC	FC			1	1	2
241UC011	Employability Skills-I	VAC	FC			3	0	3
241AC001	Environmental Science	MC	FC	2			0	2
	Total			**12**	**2**	**12**	**21**	**35**

III SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241MA007	Transform Calculus	MCC	FC	2	1		3	3
241EC001	Digital Electronics & Logic Design	MCC	FC	2		2	4	6
241EC003	Electronic Devices & Circuits	MCC	FC	2		2	4	6
241EC014	Signals & Systems	MCC	FC	2		2	4	6
241MB002	Engineering Economics	MDC	FC	3			3	3
241EC021	PCB Design	SEC	FC			2	2	4
241CS004	Internet of Things	VAC	FC			1	1	2
241UC013	Employability Skills-II	VAC	FC			3	0	3
241AC002	Constitution of India	MC	FC	2			0	2
	Total			**13**	**1**	**12**	**21**	**35**

IV SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241EC004	Random Variables & Stochastic Processes	MCC	FC	3	1		4	4
241EC006	Analog Electronics	MCC	IC	2		2	4	6
241EC008	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
241MB003	Management Science	MDC	FC	2			2	2
241EC094	Soft Computing Tools	SEC	IC			2	2	4
241CS002	Data Analysis Using Python	VAC	IC			2	2	4
241UC014	Employability Skills-III	VAC	IC			3	0	3
241AC003	Research Methodology	MC	FC	2			0	2
	Total			**13**	**2**	**10**	**20**	**32**

V SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241EC005	Electromagnetic Waves & Transmission Lines	MCC	IC	2	1		3	3
241EC009	Analog & Digital Communications	MCC	IC	2		2	4	6
241EC007	Integrated Circuits & Applications	MCC	IC	2		2	4	6
241EC012	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
241EC015	Android Applications	SEC	AC			2	2	4
241UC015	Employability Skills-IV	VAC	IC			3	0	3
241EC018	Summer Internship-I	SI	IC			2	2	4
241AC004	Intellectual Property Rights & Patents	MC	FC	2			0	2
	Total			**13**	**1**	**12**	**21**	**35**

VI SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241EC010	Digital Signal Processing	MCC	IC	2		1	3	4
241EC011	VLSI Design	MCC	IC	2		1	3	4
241EC013	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	3			3	3
	Minor Stream Course -5 or University Open Elective Course -5	MSC or UEC	AC	3			3	3
241EC016	ECAD Tools	SEC	AC			2	2	4
241AC005	Indian Knowledge Systems (IKS)	MC	FC	2				2
	Total			**16**		**7**	**21**	**30**

VII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
	Minor Stream Course -6 or University Open Elective Course -6	MSC (or) UEC	IC	3			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	3			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
241EC017	Verification using Verilog & UVM	SEC	AC			2	2	4
241EC019	Summer Internship-II	SI	IC			2	2	4
	Total			**17**		**4**	**21**	**25**

VIII SEMESTER

Course code	Course Title	Course		Credits				Total Hours
		Category	Level	L	T	P	Total	
241UC009	Technical Paper Publication	AEC	AC			2	2	4
241UC016	Employability Skills-V	VAC	AC			3	1	3
241EC096	Student Activity-Based Learning	VAC	AC				2	
241EC020	Full Semester Internship (or) Project	PROJ	AC			10	10	20
	Total					**15**	**15**	**27**

Total Credits:160

*** To acquire a minor degree, a student has to earn 20 credits in addition to the 160 credits**

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
241EC087	Fundamentals of Communications	FC	2		1	3	50	50	100	-
241EC088	Fundamentals of Signal Processing	FC	2		1	3	50	50	100	-
241EC089	Analog & Digital Circuits	IC	2			2	50	50	100	BEEE
241EC042	Wireless LAN's & PAN's	IC	3			3	50	50	100	-
241EC090	Linear & Digital IC Applications (or) Sensors & Actuators	IC	3			3	50	50	100	ADC
241EC091										
241EC092	Embedded Microcontrollers (or) Digital System Design	IC	2		1	3	50	50	100	ADC, PPSC
241EC093										
241EC067	Introduction to Internet of things (or) Modern Wireless Communications	AC	2		1	3	50	50	100	EM, WLAN's & PAN's
241EC074			3			3	50	50	100	FC
Total			**16**		**4**	**20**				

Minor Degree in Civil Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CE025	Repair & Rehabilitation of Structures	FC	3			3	50	50	100	-
241CE043	Building Planning & Computer-Aided Drawing	FC			2	2	50	50	100	-
241CE027	Green Buildings	FC	3			3	50	50	100	-
241CE040	Fundamentals of Soil Behaviour	FC	3			3	50	50	100	-
241CE054 241CE047	Railway Engineering(or) Docks & Harbour Engineering	FC	3			3	50	50	100	-
241CE036 241CE037	Environmental Impact & Risk Management(or) Environmental Management	IC	3			3	50	50	100	-
241CE056 241CE049	Urban Transportation Planning(or) Intelligent Transportation Systems	IC	3			3	50	50	100	-
Total			**18**		**2**	**20**				

Minor Degree in Electrical and Electronics Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241EE055	Operation & Control of Electric machines	FC	2			2	50	50	100	BEEE
241EE056	Fundamentals of Power Electronics	FC	2			2	50	50	100	BEEE
241EE013	Electrical Measurements & Instrumentation	FC	2		2	4	50	50	100	ENA-1/BEEE
241EE006	Electric Power Generation and Distribution Systems	IC	3			3	50	50	100	ENA-1/BEEE
241EE034 241EE027	Alternative Energy Sources (or) Utilization of Electrical Energy	IC	3			3	50	50	100	EPGDS / BEEE/ ISM
241EE037 241EE035	Hybrid Electric Vehicles (or) Special Electric machines	AC	3			3	50	50	100	FPE/ OCEM
241EE043 241EE030	Electrical Safety (or) Methods & Algorithms for Intelligent Control	AC	3			3	50	50	100	EPGDS /PSA
	Total		**18**		**2**	**20**				

Minor Degree in Mechanical Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241ME074	Basic Mechanical Engineering	FC	2			2	50	50	100	-
241ME004	Engineering Thermodynamics	IC	2	1		3	50	50	100	SSP/ MP
241ME077	Introduction to Automobile Engineering (or)	IC	3			3	50	50	100	SSP/ MP
241ME078	Mechanics of Solids									
241ME012	Heat Power Engineering (or)	IC	2	1		3	50	50	100	ETD
241ME040	Refrigeration & Air Conditioning									
241ME075	Production Technology	IC	3			3	50	50	100	EW
241ME076	Metallurgy & Material Science	IC	3			3	50	50	100	SSP/ MP
241ME079	Theory of Machines (or)	AC	3			3	50	50	100	SSP/ MP
241ME080	Advanced Engineering Metrology									
	Total		**18**	**2**		**20**				

Minor Degree in Computer Science and Engineering

Course Code	Course Title	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241CS013	Operating Systems	IC	2		1	3	50	50	100	-
241CS007	Computer Networks	IC	2		1	3	50	50	100	-
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
241AI003	Data Mining	IC	2		1	3	50	50	100	-
241CS008	Object Oriented Programming through C++ (or) Java Programming	IC	2		2	4	50	50	100	PPSC
241IT006										
241CS016	Introduction to MERN Stack Development (or) Information Security Analysis & Audit	IC			2	2	-	100	100	JP
241CS030		IC	2			2	50	50	100	-
241CS018	Advanced MERN Stack Development(or) Flutter Fundamentals	AC			2	2	-	100	100	IMSD
241IT012		AC			2	2	50	50	100	-
Total			**12**		**8**	**20**				

Minor Degree in Data Science

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241IT007	Agile Software Engineering	IC	2		1	3	50	50	100	PPSC
241CS034	Fundamentals of Data Science	IC	2		1	3	50	50	100	-
241CS012	NoSQL Databases	IC	2			2	50	50	100	-
241AI003	Data Mining	IC	2		1	3	50	50	100	-
241CS037	Health Care Data Analytics (or) Business Intelligence & Analytics	IC	2		1	3	50	50	100	-
241CS036										PPSC
241AI004	Big Data Analytics (or) Data Visualization	AC	2		1	3	50	50	100	DM
241AI019										DAP
241CS041	Social Network Analysis (or) Social Networks & Semantic Web	AC	2		1	3	50	50	100	-
241CS040										
	Total		**14**		**6**	**20**				

Minor Degree in Artificial Intelligence and Machine Learning

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241AI002	Artificial Intelligence	IC	2		1	3	50	50	100	-
241AI005	Machine Learning	IC	2		2	4	50	50	100	DAP
241AI015	AI Chatbots	IC	2			2	50	50	100	AI
241AI014	Soft Computing (or) Fundamentals of Data Science	IC	2		1	3	50	50	100	AI
241CS034			2		1	3	50	50	100	-
241AI010	Natural Language Processing (or) Data Visualization	AC	2		1	3	50	50	100	DAP
241AI019										
241AI016	Prompt Engineering and GenAI (or) Social Network Analysis	AC	2		1	3	50	50	100	ML
241CS041										
241AI017	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
241PT027	Introduction to Petroleum Engineering	FC	2			2	50	50	100	-
241PT035	Unit Operations in Petroleum Industry	FC	3			3	50	50	100	-
241PT047	Fundamentals of Geology & Reservoir Engineering	IC	3			3	50	50	100	-
241PT048	Fundamentals of Drilling & Production Engineering (or) Unconventional Hydrocarbon Resources	IC	3			3	50	50	100	-
241PT016										
241PT049	Natural Gas Hydrates (or) Fundamentals of Liquefied Natural Gas	AC	3			3	50	50	100	-
241PT005										
241PT050	Artificial Lift Techniques (or) Enhanced Oil Recovery	AC	3			3	50	50	100	-
241PT003										
241PT012	Petroleum Refinery Engineering	AC	3			3	50	50	100	-
Total			**20**			**20**				

Minor Degree in Mining Engineering

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241MN003	Development of Mineral Deposits	FC	3			3	50	50	100	-
241MN041	Green Mining	FC	3			3	50	50	100	-
241MN006	Surface Mining	IC	3			3	50	50	100	DMD
241MN024	Drilling & Blasting	IC	3			3	50	50	100	DMD
241MN007 / 241MN008	Underground Coal Mining Technology (or) Underground Metal Mining Technology	IC	3			3	50	50	100	DMD
241MN014 / 241MN028	Mine Legislation & General Safety (or) Environmental Pollution & Control	AC	3			3	50	50	100	UCMT / UMMT
241MN045 / 241MN046	Industrial Safety Practices (or) Ground Control	AC	2			2	50	50	100	-
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**	
241AE082	Fundamentals of Renewable Energy Sources	FC	3			3	50	50	100	-
241AE083	Post-harvest Engineering of Cereal Crops	FC	3			3	50	50	100	-
241AE084	Ground Water Hydrology	FC	3			3	50	50	100	-
241AE085	Micro Irrigation Systems	IC	2			2	50	50	100	-
241AE086	Surface Water Hydrology (OR) Land & Water Management Engineering	IC	3			3	50	50	100	GWH
241AE087										
241AE088	Agricultural Process Engineering & Food Quality (OR) Post-harvest Engine for Horticultural Pro	AC	3			3	50	50	100	PHECC
241AE089										
241AE090	Agricultural & Machinery Equipment (or) Design of Bio-energy systems	AC	3	0	0	3	50	50	100	FRES
241AE091										
	Total		**20**			**20**				

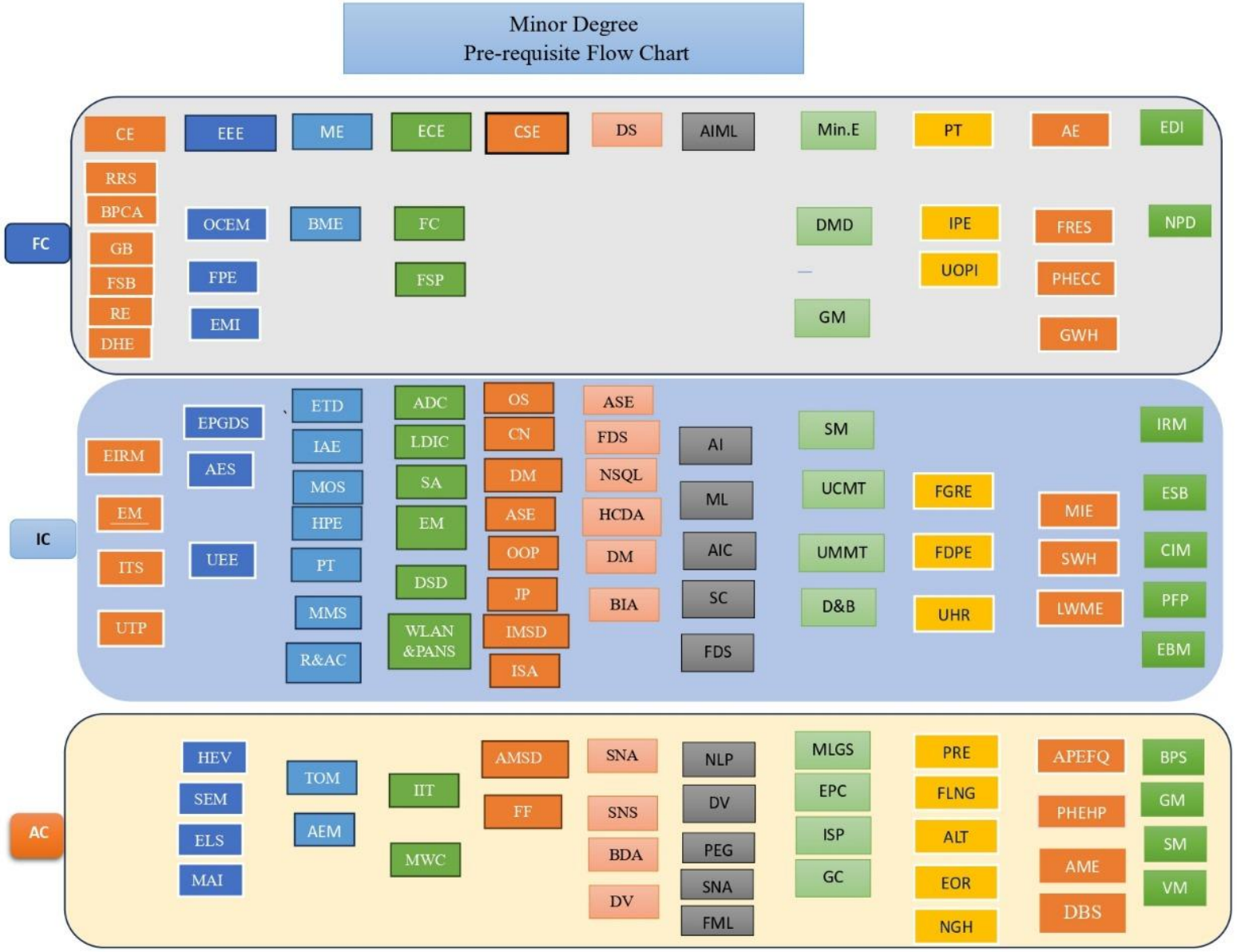
Minor Degree in Entrepreneurship Development & Incubation

Course Code	Course Name	Level	L	T	P	C	CIE	SEE	Total	Pre-requisite
241MB007	New Product Development	FC	3			3	50	50	100	-
241MB008	Entrepreneurship & Small Business Management	IC	2			2	50	50	100	-
241MB009	Insurance & Risk Management	IC	3			3	50	50	100	-
241MB010	Change & Innovations Management	IC	3			3	50	50	100	-
241MB011 241MB012	Personal Financial Planning (or) E-Business management	IC	3			3	50	50	100	-
241MB013 241MB014	Business Policy & Strategic Management (or) Green Marketing	AC	3			3	50	50	100	-
241MB015 241MB016	Startup Management (or) Venture Management	AC	3			3	50	50	100	-
Total			**20**			**20**				

Minor Degree in Quantum Technologies

S.No.	Course Code	Course Name	L	T	P	C	Semester
Mandatory Courses							
1	241EC097	Survey of Quantum technologies and Application	3	0	0	3	IV
2	241EC098	Foundations of Quantum Technologies	3	0	0	3	V
3	241EC099	Basic Programming Lab (or)	1	0	2	3	V
	241EC100	Basic Laboratory Course for Quantum Technologies					
4	241EC101	Quantum Algorithms and Cryptography	12 week 3 Credit - NPTEL MOOC			3	VII/VIII

Any One course from the below							
5	241EC102	Introduction to Quantum Computation	3	0	0	3	VI
6	241EC103	Introduction to Quantum Communication	3	0	0	3	VI
7	241EC104	Introduction to Quantum Sensing	3	0	0	3	VI
8	241EC105	Introduction to Quantum Materials	3	0	0	3	VI
Any One course from the below							
9	241EC106	Engineering Foundations of Quantum Technologies	3	0	0	3	VII
10	241EC107	Solid State Physics for Quantum Technologies	3	0	0	3	VII
11	241EC108	Quantum Optics	3	0	0	3	VII
12	241EC109	Quantum Cybersecurity	3	0	0	3	VII
13	241EC110	Quantum Machine Learning	3	0	0	3	VII
Total			**18**	**0**	**0**	**18**	


Minor Degree
Pre-requisite Flow Chart
FC
CE
EEE
ME
ECE
CSE
DS
AIML
Min.E
PT
AE
EDI
RRS
BPCA
GB
FSB
RE
DHE
OCEM
FPE
EMI
BME
FC
FSP
DMD
GM
IPE
UOPI
FRES
PHECC
GWH
NPD
IC
EIRM
EM
ITS
UTP
EPGDS
AES
UEE
ETD
IAE
MOS
HPE
PT
MMS
R&AC
ADC
LDIC
SA
EM
DSD
WLAN &PANS
OS
CN
DM
ASE
OOP
JP
IMSD
ISA
ASE
FDS
NSQL
HCDA
DM
BIA
AI
ML
AIC
SC
FDS
SM
UCMT
UMMT
D&B
FGRE
FDPE
UHR
MIE
SWH
LWME
IRM
ESB
CIM
PFP
EBM
AC
HEV
SEM
ELS
MAI
TOM
AEM
IIT
MWC
AMSD
FF
SNA
SNS
BDA
DV
NLP
DV
PEG
SNA
FML
MLGS
EPC
ISP
GC
PRE
FLNG
ALT
EOR
NGH
APEFQ
PHEHP
AME
DBS
BPS
GM
SM
VM

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				
	DHE	Docks & Harbour Engineering				
EEE	OCEM	Operation control of Electric Machines	AES	Alternative Energy Sources	MAI	Methods &Algorithms for Intelligent Control
	FPE	Fundamentals of Power Electronics	EPGDS	Electric Power Generation & Distribution Systems	HEV	Hybrid Electric Vehicles
	EMI	Electrical Measurements & Instrumentation	UEE	Utilization of Electrical Energy	SEM	Special Electric Machines
					ELS	Electrical Safety
ME	BME	Basic Mechanical Engineering	ETD	Engineering Thermodynamics	TOM	Theory of Machines
			IAE	Introduction to Automobile Engineering	AEM	Advanced Engineering Metrology
			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	IIT	Introduction to Internet of things
			LDIC	Linear & Digital IC Applications		
	FSP	Fundamentals of Signal Processing	SA	Sensors & Actuators		
			EM	Embedded Microcontrollers	MWC	Modern Wireless Communications
			DSD	Digital System Design		
			WLAN &PAN	Wireless LANS & PANS		
CSE			SE	Software Engineering		
			OOP	Object Oriented Programming through C++	AMSD	Advanced MERN Stack Development
			OS	Operating Systems	FF	Flutter Fundamentals
			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	SNA	Social Network Analysis
			FDS	Fundamentals of Data Science	DV	Data Visualization
			SE	Software Engineering	BDA	Big Data Analytics
			NSQL	NoSQL Databases	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
						NGH	Natural Gas Hydrates
				UHR	Unconventional Hydrocarbon Resources	ALT	Artificial Lift Techniques
						EOR	Enhanced Oil Recovery
	GWH	Ground Water Hydrology		LWME	Land and Water Management	DBS	Design of Bio-Energy Systems
	PHEC C	Post-harvest Engineering of Cereal Crops		SWH	Surface Water Hydrology	PHEHP	Post-Harvest Engineering for Horticultural Produce
Ag.E				MIE	Micro Irrigation Systems	AME	Agricultural Machinery and Equipment
	FRES	Fundamentals of Renewable Energy Sources				APEFQ	Agriculture Process Engineering and Food Quality
	NPD	New Product Development		ESB	Entrepreneurship and Small Business Management	BPS	Business Policy & Strategic Management
EDC				CIM	Change & Innovations Management	GM	Green Marketing
				PFP	Personal Financial Planning	SM	Startup Management
				EBM	E-Business Management	VM	Venture Management
				IRM	Insurance and Risk Management		