

**DEPARTMENT OF  
ELECTRONICS & COMMUNICATION  
ENGINEERING**

**BACHELOR OF TECHNOLOGY**

*in*

**ELECTRONICS & COMMUNICATION ENGINEERING**

**Scheme**

**For**

**2024 Admitted Batch Onwards**



**INDIAN INSTITUTE OF INFORMATION TECHNOLOGY  
BHOPAL, INDIA**

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# Undergraduate Course

The Undergraduate Course serves as a critical driver of a nation's progress and advancement, representing a dynamic entity that necessitates continuous adaptation to uphold educational excellence. Our institution offers a comprehensive 4-year B.Tech program in Electronics & Communication Engineering (ECE). The academic calendar comprises distinct odd semesters (from July to December) and even semesters (from January to June) for each academic session.

Technology's rapid advancement fosters new connections, leading to evolving aspirations, expectations, collaborations, and partnerships. Within this context, our proposed scheme focuses on three key elements: implementing the 2020 National Education Policy (NEP), the growing role of artificial intelligence, and integrating industry-aligned curricula.

## 1 Program Educational Objectives [PEO]

PEO 1: Empower graduates with a comprehensive set of technical skills, fostering entrepreneurial acumen and a research-oriented mindset, thereby equipping them for prosperous careers in the field of electronics and communication engineering.

PEO 2: Forge partnerships with industries and research establishments to address pertinent societal challenges through interdisciplinary collaboration, contributing effectively to innovative solutions.

PEO 3: Instil a sense of social responsibility and ethical values in students, motivating them to evolve into conscientious citizens and adept professionals committed to lifelong learning and self-improvement.

## 2 Programme Outcomes (POs)

PO 1: Graduates should be able to exhibit a profound understanding and hands-on expertise in circuit modelling, IC design, VLSI, communications, signal

processing, IoT, cyber physical systems and robotics. Employ this knowledge effectively to tackle intricate challenges within these domains.

PO 2: Showcase adeptness in translating conceptual algorithms from fields like communications, signal processing, computing, and sensing into real-world circuits and systems, and analyze their real-time performance.

PO 3: Apply acquired knowledge and skills to conceive and craft cutting-edge hardware and software systems, as well as innovative products that cater to contemporary technological demands.

PO 4: Display a comprehensive grasp of knowledge and skills across a wide spectrum, enabling excellence in research endeavours and interdisciplinary ventures.

### 3 Multiple Entry and Exit System (NEP 2020)

(A) IIIT Bhopal has proposed a dynamic Multi in-multi-exit system that aligns with the National Education Policy (NEP) 2020 to empower students to make well-informed educational decisions and attain their career goals. This forward-thinking approach offers students flexible options at various stages of their undergraduate journey.

(B) In accordance with the NEP recommendations, the proposed undergraduate degree program incorporates two distinct exit points, catering to a range of student preferences and ambitions.

(C) The program's structure with Entry and Exit Options is as follows:

**Entry 1:** Admission through JoSAA/CSAB Counselling.

**Exit 1:** After the second year, students who choose this exit point will earn a diploma in engineering after completing 84 credits (mandatory).

**Entry 2:** Eligibility for entry is extended to students who hold an engineering diploma from IIIT Bhopal after successfully completing a two-year (84-credit) undergraduate engineering program. A window of up to three years is allowable after acquiring the diploma to qualify for this entry. Students must meet the

stipulated B. Tech degree criteria within the timelines mentioned in clause 8 of the institute ordinances of the B.Tech program. Notably, the permissible gap duration is excluded from the computation of the overall time limit (8 years), as mentioned in clause 8 of the institute ordinances of the B.Tech program.

**Exit 2:** Upon completing the fourth year, students will be conferred with a Bachelor's degree (B.Tech), necessitating a minimum of 156 credits.

- (D) This progressive educational model empowers students to shape their academic journey according to their aspirations and circumstances. Through adopting this multi-in multi-exit system, IIT Bhopal aims to cultivate a more adaptable and empowered generation of engineers in alignment with the vision of NEP 2020.

## 4 Curriculum Structure

Teaching of the courses shall be reckoned in credits; Credits are assigned to the courses based on general pattern as shown in Table 1:

Table 1: Definition of Credits

1 hour of Lecture (L) per week	1 Credit
1 hour of Tutorial (T) per week	1 Credit
2 hours of Laboratory (P) per week	1 Credit

Total 156 Credit is required for this Program and distribution of Credits of program is shown in Table 2.

Table 2: Distribution of Credits Information

Semester	Periods Per Week			Credits
	L	T	P	
First Semester	11	5	10	21
Second Semester	12	5	8	21
Third Semester	11	5	12	22
Fourth Semester	11	5	8	20
Fifth Semester	10	5	10	20
Sixth Semester	10	4	6	17
Seventh Semester	8	4	6	15+2*
Eighth Semester	-	-	36	18
<b>Total</b>	<b>73</b>	<b>33</b>	<b>96</b>	<b>156</b>

\* Seventh Semester has 2 Credits for industrial training

Credit structure of each course is given in L-T-P form (e.g., 2-1-0). The numbers corresponding to L, T and P denote the contact hours per week for Lecture, Tutorial and Practical respectively.

#### 4.1 Definition of Course Code

Course Code Conversion is carried out according to scheme mention in Figure 1

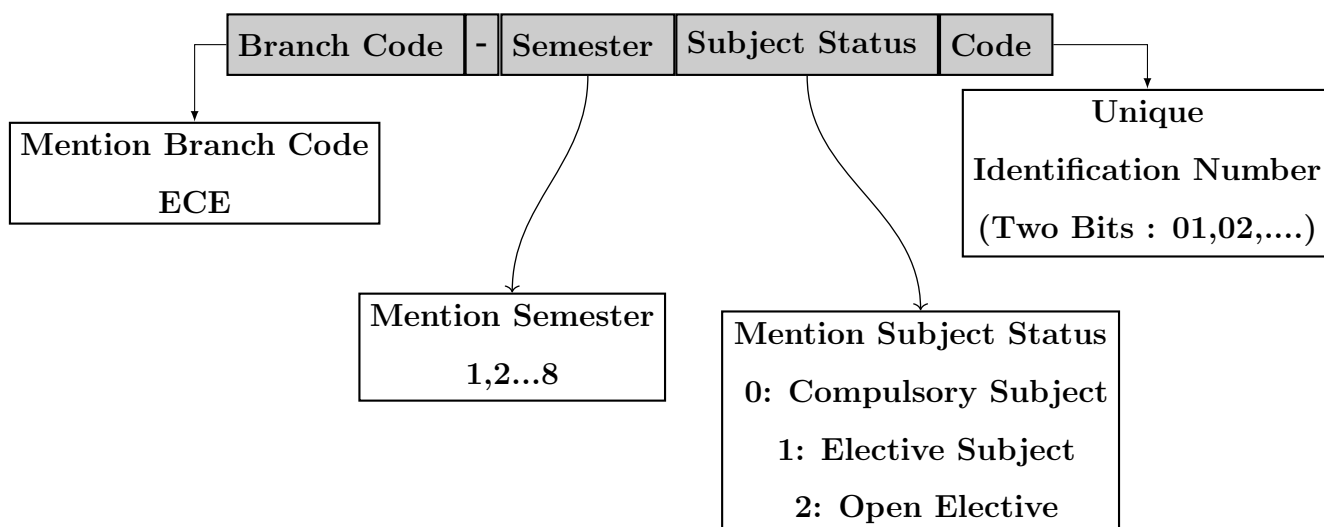


Figure 1: Course Code Conversion

## 4.2 Scheme

Semester-wise scheme and credit distribution mention in Table 3-10

Table 3: First Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
ECE-1001	Engineering Mathematics - I (Calculus)	3	1	-	4
ECE-1002	Engineering Physics	2	1	2	4
ECE-1003	Fundamentals of Computer Programming	2	1	2	4
ECE-1004	Fundamentals of Electrical and Electronics	2	1	2	4
ECE-1005	Professional Communication	2	1	2	4
ECE-1006	Yoga and Health	-	-	2	1
Total L=11,T=5,P =10		Total Credit			21

Table 4: Second Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
ECE-2001	Engineering Mathematics - II (Linear Algebra and Differential Equations)	3	1	-	4
ECE-2002	Data Structure and Algorithm	2	1	2	4
ECE-2003	Electronic Devices and Circuits	2	1	2	4
ECE-2004	Digital Logic Design	2	1	2	4
ECE-2005	Signals and Systems	3	1	-	4
ECE-2006	Ethics and Human Values for Engineers	-	-	2	1
Total L=12, T=5, P =8		Total Credit			21

Table 5: Third Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
ECE-3001	Engineering Mathematics-III (Numerical Methods and Statistics)	3	1	-	4
ECE-3002	Analog Electronic Circuits	2	1	2	4
ECE-3003	Microprocessors and Microcontroller	2	1	2	4
ECE-3004	Network Analysis and Synthesis	2	1	2	4
ECE-3005	Analog Communication	2	1	2	4
ECE-3006	Programming Lab (MATLAB, Python)	-	-	4	2
Total L=11, T=5, P =12		Total Credit			22

Table 6: Fourth Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
ECE-4001	Digital Communication	2	1	2	4
ECE-4002	Digital Signal Processing	2	1	2	4
ECE-4003	Electromagnetic Fields	3	1	-	4
ECE-4004	Control Systems	2	1	-	3
ECE-4005	Data Communication and Networks	2	1	-	3
ECE-4006	Electronic Circuit Design	-	-	4	2
Total L=11, T=5, P =8		Total Credit			20



Table 7: Fifth Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
ECE-5001	VLSI Design	2	1	2	4
ECE-5002	Microwave Engineering	2	1	2	4
ECE-5003	Digital Image Processing	2	1	2	4
ECE-5004	Mobile and Wireless Communication	2	1	-	3
ECE-51XX	ECE Elective - I	2	1	-	3
ECE-5005	Project Design	-	-	4	2
Total L=10, T=5, P=10		Total Credit			20

XX replaced with Subject code mention in table 11

Table 8: Sixth Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
ECE-6001	Optical Communication	2	1	2	4
ECE-6002	Entrepreneurship Development	2	-	-	2
ECE-62YY	Open Elective - I	2	1	-	3
ECE-61XX	ECE Elective - II	2	1	-	3
ECE-61XX	ECE Elective - III	2	1	-	3
ECE-6003	Project Implementation	-	-	4	2
Total L=10, T=4, P=6		Total Credit			17

XX replaced with Subject code mention in table 12

YY replaced with Subject code mention in table 14

Table 9: Seventh Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
ECE-7001	Antenna and Wave Propagation	2	1	2	4
ECE-72XX	Open Elective - II	2	1	-	3
ECE-71XX	ECE Elective - IV	2	1	-	3
ECE-71XX	ECE Elective - V	2	1	-	3
ECE-7002	Industrial Training	-	-	-	2*
ECE-7003	Project Dissertation	-	-	4	2
Total L=8, T=4, P=6		Total Credit			15 +2

\* 2 Credits for industrial training

XX replaced with Subject code mention in table 13

YY replaced with Subject code mention in table 15

Table 10: Eighth Semester Scheme

Course Code	Subject Name	Periods Per Week			Credits
		L	T	P	
ECE-8001	Industrial Internship / R & D Project	-	-	36	18
Total L=0, T=0, P =36		Total Credit			18

### 4.3 Electives Subject

Table 11: List of ECE Electives - I (Any one Subject for V Semester)

Course Code	Subject Name
ECE-5101	Nonlinear Optics
ECE-5102	Digital System Design
ECE-5103	Operating System
ECE-5104	Computer system and Organization
ECE-5105	Neural Networks
ECE-5106	Digital Control Systems
ECE-5107	Advanced Signal Processing - Wavelets and Multirate
ECE-5108	Power Electronics
ECE-5109	Sensors and Measurement
ECE-5110	PCB designing and 3D modelling
ECE-5111	Optimization methods in Signal Processing for Communication Systems

Table 12: List of ECE Electives – II &amp; III (Any two Subjects for VI Semester)

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<b>Course Code</b>	<b>Subject Name</b>
ECE-6101	Photonics Integrated Circuits
ECE-6102	Optoelectronics and LASER Instrumentation
ECE-6103	Satellite Communication
ECE-6104	VLSI Architecture
ECE-6105	Embedded system Design
ECE-6106	Fuzzy Logic
ECE-6107	Computer vision and Pattern Recognition
ECE-6108	Audio and Speech Processing
ECE-6109	Advanced Digital Image Analysis
ECE-6110	CAD for VLSI Design
ECE-6111	Detection and Estimation Theory
ECE-6112	Modelling and Simulation of Photonic Devices

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Table 13: List of ECE Electives – IV &amp; V (Any two Subjects for VII Semester)

Course Code	Subject Name
ECE-7101	Radar and Navigation System
ECE-7102	Biomedical Signal Processing
ECE-7103	CMOS RF IC Design
ECE-7104	Photonic Devices
ECE-7105	Remote Sensing
ECE-7106	IOT and its Applications
ECE-7107	Nanotechnology
ECE-7108	An Introduction to Quantum Computing
ECE-7109	VLSI Design Verification and Testing
ECE-7110	VLSI Interconnects and Packaging
ECE-7111	5G and Beyond Communication
ECE-7112	Advanced Statistical Signal Processing

#### 4.4 Open Elective

Table 14: Open Electives- I (Any one Subjects for VI Semester)

Course Code	Subject Name
ECE-6201	Environmental Science
ECE-6202	Technical Communication
ECE-6203	System Biology
ECE-6204	Intellectual Property Right

Table 15: Open Electives- II(Any one Subjects for VII Semester)

Course Code	Subject Name
ECE-7201	Principle of Management
ECE-7202	Engineering Economics
ECE-7203	Organizational Behaviour
ECE-7204	Research Design and Qualitative Methods

