B.TECH. ECE PROGRAMME SCHEME

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

NATIONAL INSTITUTE OFTECHNOLOGY KURUKSHETRA

B.Tech. in Electronics& Communication Engineering Programme Scheme

For Academic Year 2023-24 onwards

The Course Structure for B. Tech. Programme shall have the following categories of courses:

Sr. No.	Category
1	Institute Core (IC)
2	Non-Conventional Institute Core (NC)
3	Program Core (PC)
4	Program Elective (PE)
5	Open Elective (OE)

Course category explanation

Course category	Explanation
IC	Basic Sciences
	Engineering Arts and Sciences
	Humanities and Social Sciences
PC	Courses specific to the relevant discipline
PE	Elective Courses specific to the relevant discipline
OE	Elective Courses from any domain
NC	Courses only qualifying in nature

Course category summery sheet:

Course Category	SEMESTER								Total Courses
	I	II	III	IV	V	VI	VII	VIII	
IC	**06**	**05**	**01**	**01**	**-**	**-**	**01**	**-**	**14**
PC	**00**	**01**	**05**	**05**	**02**	**03**	**02**	**1**	**19**
PE	**-**	**-**	**-**	**-**	**2**	**2**	**2**	**2**	**08**
OE	**-**	**-**	**-**	**-**	**1**	**1**	**1**	**1**	**04**
NC	**1**	**1**	**-**	**-**	**-**	**2**	**-**	**-**	**04**
Total Credits	**20**	**20**	**22**	**20**	**20**	**23**	**23**	**18**	**49 166**

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SEMESTER – I

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T@	P	
1	IC	Economics for Engineers (OR) Business Studies	HSIC 102	3	0	0	3#
			HSIC 104	3	0	0	
2		Differential Calculus and Differential Equations	MAIC 101	3	0	0	3
3		Engineering Physics	PHIC 101	2	0	2	3
4		Engineering Practice	MEIC 102	1	0	3	2
5		Problems Solving and Programming using C	CSIC 103	3	0	2	4
6		Energy and Environment Science	CHIC 101	2	0	2	3
7	NC	Indian Knowledge Systems	HSNC 106	2	0	0	2#
		Teachings of Gita	HSNC 107				
		French Language Skills	HSNC 108				
		German Language Skills	HSNC 109				
		Japanese Language Skills	HSNC 110				
		Thought Lab and Practices	HSNC 111				
8		NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
9		NSS/Club/Technical Societies	SWNC 102	0	0	4	
	Total						**20**

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of 6th semester based on Cumulative performance up to 6th semester.

Minimum number of students required to register for the subject to be offered is 50 and maximum number is 80 in one lecture group, limited to only 2 lecture groups for any subject.

@ In lieu of tutorial, wherever necessary, assignments and interactions with the students may be conducted at their own convenience by the faculty concerned.

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B.TECH. ECE PROGRAMME

SEMESTER – II

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1.	IC	Communication Skills in English (OR) Financial Education	HSIC 101	2	0	2	3#
			HSIC 103	3	0	0	
2.		Integral Calculus and Difference Equations	MAIC 102	3	0	0	3
3.		Advanced Engineering Physics	PHIC 103	2	0	2	3
4.		Engineering Graphics (Web Design)^	CSIC 102	1	0	3	2
5.		Chemistry	CHIC 103	2	0	2	3
6.	NC	Human Values and Social Responsibility	HSNC 101	2	0	0	2#
		Sanskrit Language Skills	HSNC 102				
		Hindi Language Skills	HSNC 103				
		Telugu Language Skills	HSNC 104				
		Constitution of India	HSNC 105				
		Vedic Mathematics	MANC 101				
7.		NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
8.		NSS/Club/Technical Societies	SWNC 102	0	0	4	
9.	PC	Circuit Theory (Theory & Lab)	ECPC 101	3	0	2	4
	Total						**20**

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of 6th semester based on Cumulative performance up to 6th semester.

^Treated as a practical course (not integrated), evaluation will be as per practical course.

Minimum number of students required to register for the subject to be offered is 50 and maximum number is 80 in one lecture group, limited to only 2 lecture groups for any subject.

@ In lieu of tutorial, wherever necessary, assignments and interactions with the students may be conducted at their own convenience by the faculty concerned.

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B.TECH. ECE PROGRAMME

SEMESTER – III

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	IC	Machine Learning & Data Analytics	CSIC 221	3	0	2	4
2	PC	Electronic Devices and Circuits	ECPC 201	3	0	0	3
3		Digital Design	ECPC 202	3	0	0	3
4		Signals, Systems &Random Variables	ECPC 203	3	0	0	3
5		Fields and waves	ECPC 204	3	0	0	3
6		Communication Engineering	ECPC 205	3	0	0	3
7		Electronics-I Lab	ECPC 206	0	0	2	1
8		Digital Design Lab	ECPC 207	0	0	2	1
9		Programming with MATLAB Lab	ECPC 208	0	0	2	1
10	NC	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
11	NC	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total							**22**

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of 6th semester based on Cumulative performance up to 6th semester.

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B.TECH. ECE PROGRAMME A.Y. 2023-24

SEMESTER – IV

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	IC	Applied Linear Algebra	MAIC 204	3	0	0	3
2	PC	Analog Electronics	ECPC 209	3	0	0	3
3		Digital Communication	ECPC 210	3	0	0	3
4		Computer Architecture	ECPC 211	3	0	0	3
5		Information Theory and Coding	ECPC 212	3	0	0	3
6		Electronics-II Lab	ECPC 213	0	0	2	1
7		Communication Engineering Lab (Comm. Lab -I)	ECPC 214	0	0	2	1
8		Digital Communication Lab (Comm. Lab -II)	ECPC 215	0	0	2	1
9		Object Oriented Programming Lab	ECPC 216	1	0	2	2
10	NC	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
11	NC	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total							**20**
#Six-week internship during summer vacation Mandatory and it is to be evaluated in the V-Sem.							

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of 6th semester based on Cumulative performance up to 6th semester.

B.TECH. ECE PROGRAMME SCHEME

SEMESTER – V

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	PC	Digital Signal Processing	ECPC 301	3	0	0	3
2		Antenna &Wave Propagation	ECPC 302	3	0	0	3
3	PE	Program Elective-I	ECPE xxx	3	0	0	3
4		Program Elective -II	ECPE xxx	3	0	0	3
5	OE	Open Elective-I	ECOE xxx	3	0	0	3
6	PC	DSP Lab	ECPC303	0	0	2	1
7		HDL Lab	ECPC304	0	0	2	1
8		Transmission Lines& Antenna Lab (Comm. Lab - III)	ECPC305	0	0	2	1
9		Seminar	ECPC306	0	0	1	1
10		#Summer Training	ECPC307	Six Weeks			1
11	NC	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
12	NC	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total							**20**

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of 6th semester based on Cumulative performance up to 6th semester.

Six-week internship after IV Sem in the summer vacation mandatory, and it is to be evaluated in the V-Sem.

Sr.No	Course Title	Course Code
LIST OF PROGRAM ELECTIVES		
1	Control System Engineering	ECPE 301
2	Memory Testing	ECPE 302
3	Multicarrier Communication	ECPE 303
4	MEMS	ECPE 304
5	Wireless Technologies	ECPE 305
6	Neuro- Fuzzy Systems	ECPE 306
7	IoT & Applications	ECPE 307
8	Sensors	ECPE 308
9	Analog IC Design	ECPE 309
10	Advanced MOS Devices	ECPE 310
11	Semiconductor Photonic Devices	ECPE 311
12	Verilog HDL	ECPE 312
13	Biomedical Electronics	ECPE 313
OPEN ELECTIVE-I		
1	Communication Systems	ECOE 301
2	Microprocessors	ECOE 302

B.TECH. ECE PROGRAMME SCHEME

SEMESTER – VI

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	PC	Computer Networks	ECPC308	3	0	0	3
2		Processor Design	ECPC309	3	0	0	3
3		Microwave Theory & Devices	ECPC310	3	0	0	3
4	PE	Program Elective –III	ECPE xxx	3	0	0	3
5		Program Elective –IV	ECPE xxx	3	0	0	3
6	OE	Open Elective-II	ECOE xxx	3	0	0	3
7	PC	Processors Lab	ECPC311	0	0	2	1
8		Embedded System Lab	ECPC312	0	0	2	1
9		Machine Learning Lab	ECPC313	0	0	2	1
10	NC	NCC/ Sports /Yoga	SWNC 101	0	0	4	**2**
11	NC	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total							**23**
#Six-week internship during summer vacation Mandatory and it is to be evaluated in the VII-Sem.							

*Continuous Evaluation Model as per guidelines and the credit to be awarded at the end of 6th semester based on Cumulative performance up to 6th semester.

Sr.No	Course Title	Course Code
LIST OF PROGRAM ELECTIVES		
1	Image Processing	ECPE 314
2	Statistical Signal Processing	ECPE 315
3	Adaptive Signal Processing	ECPE 316
4	OFDM Systems	ECPE 317
5	Estimation & Detection	ECPE 318
6	Cyber Physical Systems	ECPE 319
7	Computational Electromagnetics and its Applications	ECPE 320
8	Mathematics for Machine Learning	ECPE 321
9	Embedded System Fundamentals	ECPE 322
10	Wireless Sensor Networks	ECPE 323
11	Advanced Microcontroller Architecture	ECPE 324
12	Digital IC Design	ECPE 325
13	ASICs & FPGAs	ECPE 326
14	Cryptography	ECPE 327
15	Data Science	ECPE 328
16	DSP Architecture	ECPE 329
17	Microstrip Antennas	ECPE 330
18	Data Structures	ECPE 331
LIST OF OPEN ELECTIVE-II		
1	Wireless Communications	ECOE 303
2	Logic Design and Analysis using Verilog	ECOE 304
3	Image Processing Applications	ECOE 305

B.TECH. ECE PROGRAMME SCHEME
SEMESTER – VII

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	IC	Entrepreneurship & Start Ups	XXIC XXX	3	0	0	3
2	PC	Microelectronics & VLSI Design	ECPC 401	3	0	0	3
3		Wireless & Mobile Communication	ECPC 402	3	0	0	3
4	PE	Program Elective –V	ECPE xxx	3	0	0	3
5		Program Elective –VI	ECPE xxx	3	0	0	3
6	OE	Open Elective-III	ECOE xxx	3	0	0	3
7	PC	Project-I	ECPC 403	0	0	6	3
8		Microwave Lab	ECPC 404	0	0	2	1
9		#Summer Training	ECPC 405	Six Weeks			1
Total							**23**

Six-week internship after VI Sem in the summer vacation mandatory, and it is to be evaluated in the VII-Sem.

Sr.No	Course Title	Course Code
LIST OF PROGRAM ELECTIVES		
1	Deep Learning	ECPE 401
2	Image Forensic	ECPE 402
3	Biomedical Signal Processing	ECPE 403
4	Cognitive Radio	ECPE 404
5	Speech Processing	ECPE 405
6	Mathematical Aspects of Biomedical System Design	ECPE 406
7	Optical Communication Networks	ECPE 407
8	Advanced Mobile Communication	ECPE 408
9	Multiple Access Technologies	ECPE 409
10	Optical Wireless Communication	ECPE 410
11	Bio-Sensors	ECPE 411
12	VLSI Testing and Verification	ECPE 412
13	RF Microelectronics	ECPE 413
14	Analog & Mixed Signal Design	ECPE 414
15	Nano Electronics	ECPE 415
16	Advanced Computer Networks	ECPE 416
17	Quantum Communication	ECPE 417
18	Optical Communication	ECPE 418
OPEN ELECTIVE-III		
1	Sensors	ECOE 401
2	FSM Controller Design	ECOE 402

B.TECH. ECE PROGRAMME SCHEME
SEMESTER – VIII (Internship/Course Work)

The students will not proceed for the full semester internship, will study according to the following course structure.

Sr.No	Course Category	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T	P	
1	PC	Data Security	ECPC 406	3	0	0	3
2	PE	Program Elective –VII	ECPE xxx	3	0	0	3
3		Program Elective –VIII	ECPE xxx	3	0	0	3
4	OE	Open Elective-IV	ECOE xxx	3	0	0	3
5	PC	Project –II/ **Internship***	ECPC 407	0	0	12	6
Total							**18**

Sr.No	Course Title	Course Code
LIST OF PROGRAM ELECTIVES		
1	Television & RADAR Engineering	ECPE 419
2	Sonar System/Under water Communication	ECPE 420
3	Array Signal Processing	ECPE 421
4	Optical Signal Processing	ECPE 422
5	MIMO Systems	ECPE 423
6	Optical Wireless Techniques for IoT & 5G/6G systems	ECPE 424
7	Deep Learning for Advanced Communication Systems	ECPE 425
8	Space Time Coding	ECPE 426
9	Optical Networking and Switching	ECPE 427
10	Wavelets	ECPE 428
11	Satellite Communication	ECPE 429
12	Pattern Recognition	ECPE 430
13	Wireless Network Security	ECPE 431
14	Embedded System Security	ECPE 432
15	Cyber Security	ECPE 433
16	Satellite Image Processing	ECPE 434
17	Quantum Computing	ECPE 435
18	6G Net Works	ECPE 436
19	Cloud Computing	ECPE 437
20	Soft Computing & Expert Systems	ECPE 438
21	Computer Vision	ECPE 439
LIST OF OPEN ELECTIVE-IV		
1	Internet of Things	ECOE 403
2	Computer Networks and Information Security	ECOE 404

B.TECH. ECE PROGRAMME SCHEME
Internship*
SEMESTER – VIII (Internship &Course Work)

The students who will be permitted to go for the full semester internship must earn 18 credits through one of the following two modes:

(i)Mode-I: The students will obtain 9 credits for internship and 9 credits from the three NPTEL Courses as listed below:

S.No	Course Title	Course code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
			L	T@	P	
1	NPTEL Course-1	ECOC-XXX				3
2	NPTEL Course-2	ECOC-XXX				3
3	NPTEL Course-3	ECOC-XXX				3
4	Internship	ECPC-408				9
Total						18

LIST OF NPTEL COURSES

Sr.No	Course Code	Course Title
1	ECOC 401	NPTEL Course-1
2	ECOC 402	NPTEL Course-2
3	ECOC 403	NPTEL Course-3
4	ECOC 404	NPTEL Course-4
5	ECOC 405	NPTEL Course-5
6	ECOC 406	NPTEL Course-6
7	ECOC 407	NPTEL Course-7

The list of NPTEL courses will be decided by the DAC based on the availability of courses on the NPTEL platform in that current semester.

OR

(ii) Mode-II: The students will obtain 9 credits for internship and 9 credits from the three courses (one PC and two PE's) offered by the department in the current semester on self-study mode. They have to appear for the end semester examination for these courses as per the examination schedule of the Institute.