DEPARTMENT OF ELECTRONICS ANDCOMMUNICATION ENGINEERING
NATIONAL INSTITUTE OFTECHNOLOGY KURUKSHETRA

B.Tech. in Industrial Internet of Things (IIoT) 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	pen 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	0	14
PC	00	01	05	05	02	03	02	01	19
PE	-	-	-	-	2	2	2	2	08
OE	-	-	-	-	1	1	1	1	04
NC	1	1	-	-	-	2	-	-	04
Total Credits	20	21	21	21	20	23	23	18	49 167

SEMESTER – I

Course Category	S.No	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T @	P	
IC	1	Communication Skills in English (OR) Financial Education	HSIC 101	2	0	2	**3**
			HSIC 103	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**
NC	7	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				
	8	NCC/ Sports /Yoga	SWNC 101	0	0	4	**2***
	9	NSS/Club/Technical Societies	SWNC 102	0	0	4	
Total Credits							**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.

SEMESTER – II

Course Category	S.No	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T @	P	
IC	1	Economics for Engineers (OR) Business Studies	HSIC 102	3	0	0	3
			HSIC 104	3	0	0	
	2	Integral Calculus and Difference Equations	MAIC-102	3	0	0	3
	3	Advanced Engineering Physics	PHIC 105	2	0	2	3
	4	Engineering Graphics (Web Design)^	CSIC 102	1	0	3	2
	5	Programming using Python	CSIC 104	3	0	2	4
NC	6	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				
	7	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
	8	NSS/Club/Technical Societies	SWNC 102	0	0	4	
PC	9	Circuit Theory (Theory & Lab)	IIPC 101	3	0	2	4
Total Credits							**21**

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

SEMESTER – III

Course Category	S.No	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T @	P	
IC	1	Applied Linear Algebra	MAIC 204	3	0	0	3
PC	2	Analog & Digital Electronics	IIPC 201	3	0	0	3
	3	Signals, Systems &Random Variables	IIPC202	3	0	0	3
	4	Automation Fundamentals	IIPC203	3	0	0	3
	5	Introduction to IoT	IIPC204	3	0	0	3
	6	Principles of Communication Engineering	IIPC205	3	0	0	3
	7	Electronics-Lab	IIPC206	0	0	2	1
	8	Signals & Communication Lab using MATLAB	IIPC207	0	0	2	1
	9	IoT Lab	IIPC208	0	0	2	1
NC	10	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
	11	NSS/Club/Technical Societies	SWNC102	0	0	4	
Total Credits							**21**

SEMESTER – IV

Course Category	S.No	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T@	P	
IC	1	Machine Learning & Data Analytics (INT)	CSIC 221	3	0	2	4
PC	2	Microprocessors & Computer Architecture	IIPC 209	3	0	0	3
	3	Data Structures and Algorithms	IIPC210	3	0	0	3
	4	Industry 4.0 and IIoT	IIPC211	3	0	0	3
	5	Data Communication & Networking	IIPC212	3	0	0	3
	6	Object Oriented Programming with JAVA (INT)	IIPC213	2	0	2	3
	7	Microprocessors Lab	IIPC214	0	0	2	1
	8	Programming for IoT Devices Lab	IIPC215	0	0	2	1
NC	9	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
	10	NSS/Club/Technical Societies	SWNC102	0	0	4	
		Total Credits					**21**
Six-week internship during summer vacation Mandatory and it is to be evaluated in the V semester.							

*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.

SEMESTER – V

Course Category	S.No	Course Title	Course Code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T@	P	
PC	1	Wireless Sensor Networks	IIPC 301	3	0	0	3
	2	Verilog HDL	IIPC 302	3	0	0	3
PE	3	Program Elective-I	IIPE xxx	3	0	0	3
	4	Program Elective -II	IIPE xxx	3	0	0	3
OE	5	Open Elective-I	xx OE xxx	3	0	0	3
PC-Lab	6	Wireless Sensor Networks Lab	IIPC 303	0	0	2	1
	7	Verilog HDL Lab	IIPC 304	0	0	2	1
	8	Simulation & Modeling Lab	IIPC 305	0	0	2	1
	9	Seminar	IIPC 306	0	0	1	1
	10	# Summer Training	IIPC 307	Six Weeks			1
NC	11	NCC/ Sports /Yoga	SWNC 101	0	0	4	2*
	12	NSS/Club/Technical Societies	SWNC 102	0	0	4	
		Total Credits					**20**

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

LIST OF PROGRAM ELECTIVES

Sr.No	Course Code	Course Title
PROGRAM ELECTIVES		
1	IIPE 301	Control System Engineering
2	IIPE 302	Information Theory and Coding
3	IIPE 303	Data Acquisition Systems
4	IIPE 304	Operating Systems
5	IIPE 305	Neuro- Fuzzy Systems
6	IIPE 306	Analog IC Design
7	IIPE 307	Optimization Techniques
8	IIPE 308	System Modeling & Simulation
9	IIPE 309	Smart Materials for IoT Devices
10	IIPE 310	Advanced Microcontroller Architecture

SEMESTER – VI

Course Category	S.No	Course Title	Course code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T@	P	
PC	1	Robotics	IIPC 308	3	0	0	3
	2	Embedded System Fundamentals	IIPC 309	3	0	0	3
	3	Mechatronic Systems & Applications	IIPC 310	3	0	0	3
PE	4	Program Elective-III	IIPE xxx	3	0	0	3
	5	Program Elective -IV	IIPE xxx	3	0	0	3
OE	6	Open Elective-II	xx OE xxx	3	0	0	3
PC-Lab	7	Embedded System Lab	IIPC 311	0	0	2	1
	8	Mechatronics / Industrial Automation Lab	IIPC 312	0	0	2	1
	9	Process Instrumentation Lab	IIPC 313	0	0	2	1
NC	10	NCC/ Sports /Yoga	SWNC 101	0	0	4	2
	11	NSS/Club/Technical Societies	SWNC 102	0	0	4	
		Total Credits					23
# Six-week internship during summer vacation mandatory and it is to be evaluated in the VII-sem.							

LIST OF PROGRAM ELECTIVES

Sr.No	Course Code	Course Title
PROGRAM ELECTIVES		
1	IIPE 311	Digital Signal Processing
2	IIPE 312	Deep Learning
3	IIPE 313	Energy Harvesting
4	IIPE 314	Wireless Communication Technologies for IoT
5	IIPE 315	Digital IC Design
6	IIPE 316	Data Visualization and Presentation
7	IIPE 317	Sensor Data Mining
8	IIPE 318	Introduction to Operational Technologies Networks
9	IIPE 319	ASICs & FPGAs
10	IIPE 320	Block Chain Technologies

SEMESTER – VII

Course Category	S.No	Course Title	Course code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T@	P	
IC	1	Entrepreneurship & Start Ups	MEIC 416	3	0	0	3
PC	2	IoT Security	IIPC 401	3	0	0	3
	3	Cloud, Edge & Fog Computing	IIPC 402	3	0	0	3
PE	4	Program Elective-V	IIPE xxx	3	0	0	3
	5	Program Elective -VI	IIPE xxx	3	0	0	3
OE	6	Open Elective-III	xx OE xxx	3	0	0	3
PC-Lab	7	IoT Security Lab	IIPC 403	0	0	2	1
	8	Project-I	IIPC 404	0	0	6	3
	9	# Summer Training	IIPC 405	Six Weeks			1
		Total Credits					23

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

LIST OF PROGRAM ELECTIVES

Sr.No	Course Code	Course Title
		PROGRAM ELECTIVES
1	IIPE 401	Image Processing
2	IIPE 402	Biomedical Electronics
3	IIPE 403	Optical Communication Networks
4	IIPE 404	RF Microelectronics
5	IIPE 405	Mobile Application Development
6	IIPE 406	Optical Networking &Switching
7	IIPE 407	Cognitive Radio
8	IIPE 408	RADAR & Navigation
9	IIPE 409	Vehicular Ad-hoc Networks
10	IIPE 410	Quantum Communication
11	IIPE 411	Optical Wireless Techniques for IoT & 5G/6G systems
12	IIPE 412	IoT Project Management
13	IIPE 413	SCADA System Applications
14	IIPE 414	Wearable Computing
15	IIPE 415	Parallel Computing
16	IIPE 416	Mobile Computing

SEMESTER – VIII (Internship/Course Work)

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

Course Category	S.No	Course Title	Course code	Lecture(L)/ Tutorial(T)/ Practical(P) per week			Credits
				L	T@	P	
PC	1	Selected Topics in Sensors & IoT	IIPC 406	3	0	0	3
PE	2	Program Elective-VII	IIPE xxx	3	0	0	3
	3	Program Elective -VIII	IIPE xxx	3	0	0	3
OE	4	Open Elective-IV	xx OE xxx	3	0	0	3
PC-Lab	5	Project-II/ Internship*	IIPC 407	0	0	12	6
		Total Credits					18

LIST OF PROGRAM ELECTIVES

Sr.No	Course Code	Course Title
PROGRAM ELECTIVES		
1	IIPE 417	Computer Vision
2	IIPE 418	LiDAR & Remote Sensing
3	IIPE 419	MEMS
4	IIPE 420	VLSI Physical Design
5	IIPE 421	DSP Architecture
6	IIPE 422	IoT Enhanced AR&VR
7	IIPE 423	Quantum Computing
8	IIPE 424	6G Networks
9	IIPE 425	Nano Sensors
10	IIPE 426	Bio-Sensors
11	IIPE 427	Image Forensics
12	IIPE 428	Biomedical Signal Processing
13	IIPE 429	E-Commerce and ERP
14	IIPE 430	Soft Computing & Expert Systems
15	IIPE 431	Industrial IoT Markets & Security
16	IIPE 432	Data Base Management Systems

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	IIOC-xxx				3
2	NPTEL Course-2	IIOC-xxx				3
3	NPTEL Course-3	IIOC-xxx				3
4	Internship	IIPC-408				9
Total						18

LIST OF NPTEL COURSES

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