Proceedings of Board of Studies Meeting

(Held on February 13, 2023)

Syllabus for the programs:

Bachelor of Technology in Electronics Engineering

(As per the Ordinances for Bachelor of Technology as per Academic Council)

Submitted By

Department of Electronics Engineering,

Harcourt Butler Technical University,

Nawabganj, Kanpur-208002 (UP)

Contents

Vision, Mission and Program Educational Objectives

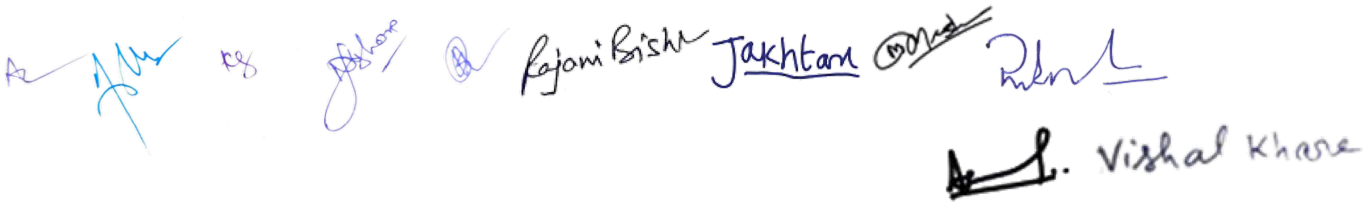
VISION AND MISSION OF THE DEPARTMENT

Vision

Department of Electronics Engineering aims to deliver Technical Education in the field of Electronics and Communication Engineering, for producing Engineers and Technologists who are happy, healthy and competent professionals, motivated to serve the society through research & innovation.

Mission

1. To educate and train the students with state-of-the-art in Electronics and Communication Engineering.
2. To prepare the students who are fit for meeting the requirements and challenges of the Industry right at the time of their graduation by evolving a sustainable Industry-University interaction system for this.
3. To upgrade the teaching standards through continued efforts toward improvement of the qualification and expertise of the teachers as well as supporting staff.
4. To create awareness amongst the students towards socio environmental technologies by offering related courses and organizing seminars/workshops on these topics in the university and by encouraging participation in similar activities at other places.
5. To expand research and development activities in the frontier areas related to Electronics and Communication.
6. To include the aspect of integration of environmental balance and human values in the curriculum.
7. To provide academic support to other technical institutions at state & national level through the process of networking.
8. To start social service programs like education for masses, particularly using the enhanced means of communication.



VISION AND MISSION OF THE UNIVERSITY

VISION

"To achieve excellence in technical education, research and innovation".

MISSION

1. Imparting Knowledge to develop analytical ability in science and technology to serve the industry and society at large.
2. Equip and enable students with conceptual, technical and managerial skills to transform the organization and society.
3. Inculcating entrepreneurial philosophy and innovative thinking to promote research, consultancy and institutional social responsibility.
4. Serving people, society and nation with utmost professionalism, values and ethics to make development sustainable and quality of life.

Program Educational Objectives (PEOs)

Program graduates, within three years from their graduation will

PEO 1: have knowledge of basic and applied sciences, so as to apply the necessary competence for technically sound, economically feasible and socially acceptable solutions of real life complex engineering problems.

PEO 2: be fit for meeting the requirements and challenges of industries, research and academic institutions both at the national and International level, by applying expertise gained in area of electronics and communication engineering.

PEO 3: be professionally competent with excellent communication and management skills along with being enterprising professionals and responsible citizens capable of delivering their services individually as well as in a collaborative framework.

Structure of the Curriculum

Semester Wise Course Structure & Evaluation Scheme

For B.Tech. in Electronics Engineering

(Effective from Session 2022-2023 for new entrants)

BSC: Basic Science Course
ESC: Engineering Science Course
PEC: Program Elective Course
OEC : Open Elective Course
PCC: Program Core Course
HSMC: Hum., Social Sc. and Management Courses

I Semester

S. No.	Course Type	Course Title	Subject Code*	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	BSC	Engineering Chemistry	NCY	4	3	0	2	15	20	15	50	50	**100**
2	ESC	Introduction to Computer Science &Engineering	NCS	4	3	1	0	30	20	-	50	50	**100**
3	ESC	Introduction to Electronics Engineering	NET 101	4	3	1	0	30	20	-	50	50	**100**
4	ESC	Introduction to Civil Engineering	NCE	4	3	1	0	30	20	-	50	50	**100**
5	ESC	Introduction to Chemical Engineering& Chemical Technology	NCH	4	3	1	0	30	20	-	50	50	**100**
6	ESC	Workshop Practice	NWS	2	0	0	4	-	20	30	50	50	**100**
	Total Credits: 22												**600**

***** NET 102: Introduction to Electronics Engineering (Even Sem)

II Semester

S. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	BSC	Engineering Physics	NPH	4	3	0	2	15	20	15	50	50	**100**
2	BSC	Engineering Mathematics-I	NMA	4	3	1	0	30	20	-	50	50	**100**
3	ESC	Introduction to Electrical Engineering	NEE	4	3	0	2	15	20	15	50	50	**100**
4	ESC	Introduction to Mechanical Engineering	NME	4	3	1	0	30	20	-	50	50	**100**
5	HSMC	Professional Communication	NHS	4	2	1	2	15	20	15	50	50	**100**
6	ESC	Engineering Graphics	NCE	2	0	0	4	30	20	-	50	50	**100**
	Total Credits: 22												**600**

III Semester

S. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	BSC	Engg. Math-II	NMA	4	3	1	0	30	20	0	50	50	100
2	ESC	Electrical Circuit Analysis	NEE	5	3	1	2	15	20	15	50	50	100
3	PCC	Electrical Measurement and Measuring Instruments	NEE	4	3	1	0	30	20	0	50	50	100
4	PCC	Solid State Devices and Circuits *	NET 201	4	3	0	2	15	20	15	50	50	100
5	PCC	Digital Electronics	NET 203	4	3	0	2	15	20	15	50	50	100
6	PCC	Hardware Description Language	NET 205	3	2	0	2	15	20	15	50	50	100
	Total Credits: 24												**600**

NET 207: Digital Electronics (CS & IT) and NET 209: Solid State Devices and Circuits (EE)

IV Semester

S. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	BSC	Engg. Maths-III	NMA	4	3	1	0	30	20	0	50	50	100
2	ESC	Data Structure Using C	NCS	4	2	1	2	15	20	15	50	50	100
3	PCC	Electro Magnetic Field Theory	NET 202	4	3	1	0	30	20	0	50	50	100
4	PCC	Signals & Systems *	NET 204	5	3	1	2	15	20	15	50	50	100
5	PCC	Analog Circuits	NET 206	4	3	0	2	15	20	15	50	50	100
6	HSMC	Engg. Economics & Management	NHS	3	3	0	0	30	20	0	50	50	100
	Total Credits: 24												**600**

*NPTEL Courses

Rajani Bisht Jakhtam Vishal Khare

V - Semester

S. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	PCC	Antenna and Wave Propagation	NET 301	4	3	1	0	30	20	0	50	50	100
2	PCC	Analog Communication*	NET 303	4	3	0	2	15	20	15	50	50	100
3	PCC	Linear System Theory (Control Systems)	NET 305	4	3	1	0	30	20	0	50	50	100
4	PCC	Microprocessors and Microcontrollers	NET 307	4	3	0	2	15	20	15	50	50	100
5	PCC	VLSI Technology	NET 309	4	3	1	0	30	20	0	50	50	100
6	OEC-I	Open Elective-I	OET	2	2	0	0	30	20	0	50	50	100
	Total Credits: 22												**600**

VI -Semester

S. No.	Course Type	Course Title	Subject Code*	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	PCC	Analog Integrated Circuit	NET 302	4	3	0	2	15	20	15	50	50	100
2	PCC	Digital Communication*	NET 304	4	3	1	0	30	20	0	50	50	100
3	PCC	VLSI Design*	NET 306	5	3	1	2	15	20	15	50	50	100
4	PCC	Digital Signal Processing*	NET 308	4	3	0	2	15	20	15	50	50	100
5	PEC-I	PEC -I	NET	3	3	0	0	30	20	0	50	50	100
6	HSMC	Entrepreneurship Development	NHS	2	2	0	0	30	20	-	50	50	100
	Total Credits: 22												**600**

*NPTEL Courses

Rajani Bisht Jakhtam Vishal Khare

VII-Semester

S. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	PEC-II	PEC-II	NET	4	3	1	0	30	20	0	50	50	100
2	PEC-III	PEC -III	NET	3	3	0	0	30	20	0	50	50	100
3	PEC-IV	PEC -IV	NET	3	3	0	0	30	20	0	50	50	100
4		Seminar	NET 471	2	0	0	4	0	50	0	50	50	100
5		Industrial Training	NET 481	2	0	0	4	0	50	0	50	50	100
6		Minor Project	NET 491	6	0	0	12	0	50	0	50	50	100
7	OEC-II	Open Elective-II	OET	2	2	0	0	30	20	0	50	50	100
	Total Credits: 22												**700**

VIII -Semester

S. No.	Course Type	Course Title	Subject Code	Credits	Periods			Sessional Marks				ESE	Total Marks
					L	T	P	MSE	TA	Lab	Total		
1	PEC-V	PEC -V	NET	4	3	1	0	30	20	0	50	50	100
2	OEC-III	Open Elective-III	OET	2	2	0	0	30	20	0	50	50	100
3		Project	NET 492	16	0	0	32	0	50	0	200	200	400
	Total Credits: 22												**600**

Note: Internal Evaluation of Project in VII semester will be conducted by the Departmental Committee. Evaluation of project in VIII semester will be conducted by External and Internal Examiners.

ELECTIVE-I

SI.NO.	Course Type	Subject Code	Course Title	Credits(LTP)	Sessional Marks				ESE	Total Marks
					MSE	TA	Lab	Total		
1.	PEC-I	NET 322	DSD using VHDL	3(3-0-0)	30	20	-	50	50	100
2.	PEC-I	NET 324	Filter Design and Analysis	3(3-0-0)	30	20	-	50	50	100
3.	PEC-I	NET 326	Microwave and Radar Engineering	3(3-0-0)	30	20	-	50	50	100
4.	PEC-I	NET 328	Data Communication Network	3(3-0-0)	30	20	-	50	50	100
5.	PEC-I	NET 330	Advanced Semiconductor Devices (ASD)	3(3-0-0)	30	20	-	50	50	50

ELECTIVE-II

SI.NO.	Course Type	Subject Code	Course Title	Credits(LTP)	Sessional Marks				ESE	Total Marks
					MSE	TA	Lab	Total		
1.	PEC-II	NET 421	Semiconductor Device Modelling	4(3-1-0)	30	20	-	50	50	100
2.	PEC-II	NET 423	Image Processing	4(3-1-0)	30	20	-	50	50	100
3.	PEC-II	NET 425	Optical Communication	4(3-1-0)	30	20	-	50	50	100
4.	PEC-II	NET 427	Opto-Electronics	4(3-1-0)	30	20	-	50	50	100

ELECTIVE-III

SI.NO.	Course Type	Subject Code	Course Title	Credits(LTP)	Sessional Marks				ESE	Total Marks
					MSE	TA	Lab	Total		
1.	PEC-III	NET 441	Embedded Systems	3(2-0-2)	15	20	15	50	50	100
2.	PEC-III	NET 443	VLSI Device verification &Testing	3(3-0-0)	30	20	-	50	50	100
3.	PEC-III	NET 445	Biomedical Signal Processing	3(2-0-2)	15	20	15	50	50	100
4.	PEC-III	NET 447	Wireless Communication	3(3-0-0)	30	20	-	50	50	100
5.	PEC-III	NET 449	Radio Frequency Integrated Circuit	3(3-0-0)	30	20	-	50	50	100

ELECTIVE-IV

SI.NO.	Course Type	Subject Code	Course Title	Credits(LTP)	Sessional Marks				ESE	Total Marks
					MSE	TA	Lab	Total		
1.	PEC-IV	NET 461	SoC Design	3(3-0-0)	30	20	-	50	50	100
2.	PEC-IV	NET 463	Adaptive Systems	3(3-0-0)	30	20	-	50	50	100
3.	PEC-IV	NET 465	Satellite Communication	3(3-0-0)	30	20	-	50	50	100
4.	PEC-IV	NET 467	Photo-Voltaic Cell	3(3-0-0)	30	20	-	50	50	100
5.	PEC-IV	NET 469	Sensor technology	3(3-0-0)	30	20	-	50	50	100

ELECTIVE-V

SI.NO.	Course Type	Subject Code	Course Title	Credits(LTP)	Sessional Marks				ESE	Total Marks
					MSE	TA	Lab	Total		
1.	PEC-V	NET 422	VLSI Implementation of DSP Algorithms	4(3-1-0)	30	20	-	50	50	100
2.	PEC-V	NET 424	Network Science	4(3-1-0)	30	20	-	50	50	100
3.	PEC-V	NET 426	Micro Electronic Mechanical Systems (MEMS)	4(3-1-0)	30	20	-	50	50	100

List of Open Electives

	OEC-I	OEC-II	OEC-III
1.	Human Values	Soft Computing	Robotics
2.	Cyber Security	Artificial Intelligence	Data Sciences
3.	Indian Knowledge Tradition	3-D Printing	Machine Learning
4.	Environment & Ecology	Logistics & Supply Chain Management	Sustainable Development
5.	One Course Offered by each degree awarding departments	One Course Offered by each degree awarding departments	One Course Offered by each degree awarding departments
6.	One Course Offered by School of Basic & Applied Sciences	One Course Offered by School of Basic & Applied Sciences	One Course Offered by School of Basic & Applied Sciences
7.	One Course Offered by School of Humanities & Social Sciences	One Course Offered by School of Humanities & Social Sciences	One Course Offered by School of Humanities & Social Sciences

List of Open Elective Courses offered by Electronics Department

OPEN ELECTIVE-I

SI.NO.	Course Type	Subject Code	Course Title	Credits(LTP)	Sessional Marks				ESE	Total Marks
					MSE	TA	Lab	Total		
1.	OEC-I	OET 301	Analog Circuits	2(2-0-0)	30	20	-	50	50	100
2.	OEC-I	OET 303	System Design using MATLAB	2(2-0-0)	30	20	-	50	50	100
3.	OEC-I	OET 305	Semiconductor Devices	2(2-0-0)	30	20	-	50	50	100

OPEN ELECTIVE-II

SI.NO.	Course Type	Subject Code	Course Title	Credits(LTP)	Sessional Marks				ESE	Total Marks
					MSE	TA	Lab	Total		
1.	OEC-II	OET 401	VLSI Technology	2(2-0-0)	30	20	-	50	50	100
2.	OEC-II	OET 403	Communication Systems	2(2-0-0)	30	20	-	50	50	100
3.	OEC-II	OET 405	Integrated Circuits	2(2-0-0)	30	20	-	50	50	100

OPEN ELECTIVE-III

SI.NO.	Course Type	Subject Code	Course Title	Credits(LTP)	Sessional Marks				ESE	Total Marks
					MSE	TA	Lab	Total		
1.	OEC-III	OET 402	Satellite Communication	2(2-0-0)	30	20	-	50	50	100
2.	OEC-III	OET 404	Mobile Communication	2(2-0-0)	30	20	-	50	50	100
3.	OEC-III	OET 406	Network Science	2(2-0-0)	30	20	-	50	50	100

The components of the curriculum

Table (a) Program curriculum grouping based on course components

Course Component	Curriculum Content (% of total Credits of the program)	Total number of credits
Basic Sciences (BSC)	11.11	20
Engineering Sciences(ESC)	20.55	37
Humanities and Social Sciences (HSMC)	5	9
Program Core (PCC)	36.11	65
Program Electives (PEC)	9.44	17
Open Electives (OEC)	3.33	6
Project(s)	12.22	22
Industrial training and Seminars	2.22	2+2=4
Total		**180**

Table (b) Program curriculum grouping based on course components as per semester: **Frequency & Credits**

Sem	BSC		ESC		HSMC		PCC		PEC		OEC		Project		Ind. training		Seminar		Total
	Credits	No.	Credits	No.	Credits	No.		No.	Credits	No.	Credits	No.	Credit	No.	Credit	No.	Credit	No.	Credit
I	4	1	4*4 +2=18	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22
II	4+4=8	2	4+4+2=10	3	4	1	-	-	-	-	-	-	-	-	-	-	-	-	22
III	4	1	5	1	-	-	4+4+4+3=15	4	-	-	-	-	-	-	-	-	-	-	24
IV	4	1	4	1	3	1	4+5+4=13	3	-	-	-	-	-	-	-	-	-	-	24
V	-	-	-	-	-	-	4+4+4+4+4=20	5	-	-	2	1	-	-	-	-	-	-	22
VI	-	-	-	-	2	1	4+4+5+4=17	4	3	1	-	-	-	-	-	-	-	-	22
VII	-	-	-	-	-	-	-	-	10	3	2	1	6	1	2	1	2	1	22
VIII	-	-	-	-	-	-	-	-	4	1	2	1	16	1	-	-	-	-	22
Tot	**20**	**5**	**37**	**10**	**9**	**3**	**65**	**16**	**17**	**5**	**6**	**3**	**22**	**2**	**2**	**1**	**2**	**1**	**180**