Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

Bachelor of Technology

in

Electronics & Telecommunication Engineering

Programme Structure

(As per AICTE guidelines, with effect from the Academic Year 2022-23)

Preamble

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated, and taken forward in a systematic manner. Therefore, autonomy for Vidyalankar Institute of Technology is not merely a transition from pre-cooked syllabi to self-designed curriculum. Autonomy curriculum of the Institute offers required academic flexibility with emphasis on industry requirements and market trends, employability and problem-solving approach which leads to improving competency level of learners with diverse strengths. In line with this, the curriculum framework designed is **Choice-Based Credit and Grading System (CBCGS)**. Number of credits for each category of courses learnt by learners, internships and projects is finalized considering the scope of study and the ability that a learner should gain through the programme. The overall credits and approach of curriculum proposed is in line with AICTE model curriculum.

The curriculum comprises courses from various categories like basic sciences, humanities and social sciences, engineering sciences, general education and branch specific courses including professional electives and open electives. The curriculum has core courses of branch of engineering positioned and sequenced to achieve sequential and integral learning of the entire breadth of the specific branch. These courses are completed by third year of the engineering programme that enables learners to prepare for higher education during their final year. Professional elective courses, that begins from third year of programme, offer flexibility and diversity to learners to choose specialization from a basket of recent developments in their field of technology. The selection of unique professional elective courses based on industrial requirements and organizing them into tracks is a salient feature of this curricula ensuring employability. Open Elective courses cover multi-disciplinary, special skill development, project management and similar knowledge that make learner capable to work in industrial environment.

For holistic development of learners, apart from technical courses, Humanities and Social Science courses develop the required soft-skills and attitude amongst learners. Our curriculum also introduces Social Service Internship and Internship with institutes abroad along with courses like Design Thinking, Wellness - Body, Mind & Spirit, Indian Traditional Knowledge System under General Education category. These general education courses aim to create balance in brain hemispheres and hence improve learners' clarity in thoughts and responses.

Additionally, curriculum provides add-on minor/honours degree that involves field/ domain study. Learner can avail this degree by completing requirement of additional 15 credits. Thus, the academic plan of VIT envisages a shift from summative to formative and competency-based learning system which will enhance learner's ability towards higher education, employability and entrepreneurship.

Chairman, Board of Studies
Department of Electronics & Telecommunication Engineering
Vidyalankar Institute of Technology

Chairman, Academic Council
Vidyalankar Institute of Technology

COMPETENCE BASED COURSE CATEGORIES AND CREDIT ALLOTMENT

Sr. No.	Competence	Course Category	Credits/Audit
I	Knowledge	Basic Science	19
II		Engineering Science	18
III		Core	56
IV	Skills	Professional Elective	18
V		Open Elective	15
VI		Project and Internship	15
VII	Attitude	Humanities, Social Sciences and Management	10
VIII		General Education	14
Total			**165**

Learner is expected to complete requirement of 165 credits (with minimum credits under each category as mentioned above) for B.Tech. degree in Electronics & Telecommunication Engineering.

Additionally, learners can choose to avail Honours/ Minor Degree by completing requirements of 18 credits, which will be over and above the 165 credits required for B.Tech. degree.

Structure of Honours/ Minor Degree:

Sr. No.	Category	Credits
1	Course Work	9
2	Industrial Interaction	1
3	Survey Report/ Scholarly Term Paper	2
4	Seminar	2
5	Capstone Project	4
Total		**18**

Definition of Credit:

Duration	Credits
1 Hr. Lecture (L) per week	1
1 Hr. Tutorial (T) per week	1
1 Hr. Practical (P) per week	0.5

Courses under Various Categories

I. Basic Science Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	BS16T*	Engineering Chemistry	2	-	-	2	1
2	BS16P*	Engineering Chemistry Lab	-	2	-	1	1
3	BS02*	Engineering Mathematics- I	3	-	-	3	1
4	BS15T*	Engineering Physics	2	-	-	2	2
5	BS15P*	Engineering Physics Lab	-	2	-	1	2
6	BS04*	Engineering Mathematics-II	3	-	-	3	2
7	BS33	Engineering Mathematics-III	3	-	-	3	3
8	BS34T	Mathematical theory of Communication	3	-	-	3	4
9	BS34P	Mathematical theory of Communication Lab	-	2	-	1	4

*** Courses exempted for Direct Second Year (DSY) students who will secure admission through lateral entry from the A.Y. 2023-24 onwards.**

II. Engineering Science Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ES02T*	Engineering Mechanics	2	-	-	2	1
2	ES02P*	Engineering Mechanics Lab	-	2	-	1	1
3	ES08T*	Basic Electrical & Electronics Engineering	2	-	-	2	1
4	ES08P*	Basic Electrical & Electronics Engineering Lab	-	2	-	1	1
5	ES04T*	Structured Programming	2	-	-	2	1
6	ES04P*	Structured Programming Lab	-	2	-	1	1
7	ES05T*	Object oriented Programming	2	-	-	2	2
8	ES05P*	Object oriented	-	2	-	1	2

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
		Programming Lab					
9	ES09T*	Logic Circuit	2	-	-	2	2
10	ES09P*	Logic Circuit Lab	-	2	-	1	2
11	ES01T*	Engineering Graphics	2	-	-	2	2
12	ES01P*	Engineering Graphics Lab	-	2	-	1	2

*** Courses exempted for Direct Second Year (DSY) students who will secure admission through lateral entry from the A.Y. 2023-24 onwards.**

III. Core Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ET01T	Electronic Devices and Circuits	2	-	-	2	3
2	ET01P	Electronic Devices and Circuits Lab	-	2	-	1	3
3	ET02T	Principles of Communication Engineering	2	-	-	2	3
4	ET02P	Principles of Communication Engineering Lab	-	2	-	1	3
5	ET03T	Signal and Systems	3	-	-	3	4
6	ET03P	Signal and Systems Lab	-	2	-	1	4
7	ET04T	Network Theory and Transmission lines	3	-	-	3	3
8	ET04P	Network Theory and Transmission lines Lab	-	2	-	1	3
9	ET05T	Microprocessor & micro controller	3	-	-	3	3
10	ET05P	Microprocessor & micro controller Lab	-	2	-	1	3
11	ET06T	Integrated Circuits	2	-	-	2	4
12	ET06P	Integrated Circuits Lab	-	2	-	1	4
13	ET07T	Data Structure & Analysis of Algorithm	2	-	-	2	4
14	ET07P	Data Structure & Analysis of Algorithm Lab	-	2	-	1	4

15	ET08	Instrumentation and Control Systems Lab	-	2	-	1	3
16	ET09T	Digital Communication	2	-	-	2	4
17	ET09P	Digital Communication Lab	-	2	-	1	4
18	ET10T	Digital Signal Processing	2	-	-	2	5
19	ET10P	Digital Signal Processing Lab	-	2	-	1	5
20	ET11T	Electromagnetics and Antenna	3	-	-	3	5
21	ET11P	Electromagnetics and Antenna Lab	-	2	-	1	5
22	ET12T	RF and Microwave Engineering	3	-	-	3	7
23	ET12P	RF and Microwave Engineering Lab	-	2	-	1	7
24	ET13T	Optical Communication	2	-	-	2	8
25	ET13P	Optical Communication Lab	-	2	-	1	8
26	ET14T	Mobile Communication	2	-	-	2	6
27	ET14P	Mobile Communication Lab	-	2	-	1	6
28	ET16T	Computer Communication Network	2	-	-	2	5
29	ET16P	Computer Communication Network Lab	-	2	-	1	5
30	ET17	Skill Based Lab		2	-	1	3
31	ET18T	Digital VLSI	2	-	-	2	5
32	ET18P	Digital VLSI Lab	-	2	-	1	5
33	ET19T	Digital Image Processing	2	-	-	2	6
34	ET19T	Digital Image Processing	-	2	-	1	6

IV. Professional Elective Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ET20T	Digital System Design using	2	-	-	2	5

		Verilog and FPGA					
2	ET20P	Digital System Design using Verilog and FPGA Lab	-	2	-	1	5
3	ET21T	Advanced Communication	2	-	-	2	5
4	ET21P	Advanced Communication Lab	-	2	-	1	5
5	ET22T	Power Electronics	2	-	-	2	5
6	ET22P	Power Electronics Lab	-	2	-	1	5
7	ET31T	Sensor Technology	2	-	-	2	5
8	ET31P	Sensor Technology Lab	-	2	-	1	5
9	ET32T	Machine Learning	2	-	-	2	5
10	ET32P	Machine Learning Lab	-	2	-	1	5
11	ET33T	Data Base Management System	2	-	-	2	5
12	ET33P	Data Base Management System Lab	-	2	-	1	5
13	ET34T	Computer Graphics	2	-	-	2	5
14	ET34P	Computer Graphics Lab	-	2	-	1	5
15	ET23T	ASIC and Verification	2	-	-	2	6
16	ET23P	ASIC and Verification Lab	-	2	-	1	6
17	ET24T	Software Defined Radio	2	-	-	2	6
18	ET24P	Software Defined Radio Lab	-	2	-	1	6
19	ET25T	High Performance Computer Architecture	2	-	-	2	6
20	ET25P	High Performance Computer Architecture Lab	-	2	-	1	6
21	ET35T	IOT and Industry 4.0	2	-	-	2	6
22	ET35P	IOT and Industry 4.0 Lab	-	2	-	1	6
23	ET36T	Soft Computing	2	-	-	2	6
24	ET36P	Soft Computing Lab	-	2	-	1	6
25	ET37T	Data Mining	2	-	-	2	6
26	ET37P	Data Mining Lab	-	2	-	1	6

27	ET38T	Operating System	2	-	-	2	6
28	ET38P	Operating System Lab	-	2	-	1	6
29	ET26T	Analog IC Design	2	-	-	2	7
30	ET26P	Analog IC Design Lab	-	2	-	1	7
31	ET27T	Satellite Communication	2	-	-	2	7
32	ET27P	Satellite Communication Lab	-	2	-	1	7
33	ET28T	Telecommunication Network Management	2	-	-	2	7
34	ET28P	Telecommunication Network Management Lab	-	2	-	1	7
35	ET29T	Robotics	2	-	-	2	7
36	ET29P	Robotics Lab	-	2	-	1	7
37	ET39T	Advanced Embedded Systems	2	-	-	2	7
38	ET39P	Advanced Embedded Systems Lab	-	2	-	1	7
39	ET40T	Deep Learning	2	-	-	2	7
40	ET40P	Deep Learning Lab	-	2	-	1	7
41	ET41T	Big Data Analytics	2	-	-	2	7
42	ET41P	Big Data Analytics Lab	-	2	-	1	7
43	ET42T	Cloud Computing	2	-	-	2	7
44	ET42P	Cloud Computing Lab	-	2	-	1	7

V. Open Elective Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	OE01	Cyber Law	3	-	-	3	7
2	OE02	Project Management	3	-	-	3	7
3	OE03T	Product Lifecycle Management	3	-	-	3	7
4	OE04	Sustainability Management	3	-	-	3	7
5	OE05	Operation Research	3	-	-	3	7
6	OE06	IPR and Patenting	3	-	-	3	8
7	OE07	Research Methodology	3	-	-	3	8

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
8	OE08	Renewable Energy Management	3	-	-	3	8
9	OE09	Energy Audit and Management	3	-	-	3	8
10	OE10	E-Farming	3	-	-	3	8
11	OE11	Bioinformatics	3	-	-	3	8
12	OE12	Nanotechnology	3	-	-	3	8

VI. Project and Internship

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ET45	Mini Project- 1 (Hardware)	-	4	-	2	4
2	ET46	Mini Project- 2 (Software)	-	4	-	2	5
3	ET47	Industry Internship	-	120 (Total)	-	4	TE Break
4	ET48	Project-1 (Synopsis)	3	-	-	3	7
5	ET49	Project-2 (Final)	1	6	-	4	8

VII. Humanities, Social Sciences and Management Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	HS01T*	Effective Communication	2	-	-	2	1
2	HS01P*	Effective Communication Lab	-	2	-	1	1
3	HS02T*	Professional Skills	2	-	-	2	2
4	HS02P*	Professional Skills Lab		2	-	1	2
5	HS07	Technical Communication	-	2	-	1	3
6	HS04	Presentation Skills	-	2	-	1	4
7	HS08	Engineering Economics	2	-	-	2	6

*** Courses exempted for Direct Second Year (DSY) students who will secure admission through lateral entry from the A.Y. 2023-24 onwards.**

VIII. General Education

Arts	A
Social and Behavioral Science	SB
Creativity and Innovation	CI
Political Science	PS

Physical Education and Wellness	PEW
Finance	F
Natural Science	NS
Wonders of Infrastructure	WI

Course Code	Course Name	Credits
GEA01	Voice Culture for Professional Speaking	2
GEA02	Various Dance Forms	2
GEA03	Exploring Indian Art	2
GESB01#	Social Service Internship/ Project	3
GESB02	Universal Human Values	2
GESB03	Indian Traditional Knowledge System	2
GESB04	Corporate and Social Etiquettes	2
GESB05	Global Citizenship Education	2
GESB06	Responsibility towards sustainable environment	2
GESB07	Psychology	2
GECI01	Design Thinking	3
GECI02	Innovation and Entrepreneurship	1
GEPS01	Indian Constitution	2
GEPS02	Four Pillars of Democratic Nation	2
GEPEW01	Wellness – Body, Mind & Spirit	2
GEPEW02	IQ vs EQ	2
GEPEW03	Nutrition and Physical Wellness	2
GEF01	Basics of Finance & Legal aspects for Business	2
GEF02	Financial Management for beginners	2
GENS01	Facets of Astronomy	2
GENS02	Modern Farming	2
GEWI01	Railways - Wonders of Infrastructure	2
GE01$	Internship with other Institutes (Credit Transfer)	4

 # For GESB01- Social Service Internship/ Project: 2 hours / week slot will be provided during the semester (in regular timetable). Additional work of 60 hours needs to be completed during the semester (besides regular timetable) or after the semester (during inter semester break).

$ For GE01- Internship with other Institutes (Credit Transfer): Internship with other reputed institutes equivalent to 4 credits is recommended to be done by learner during second year inter semester break (i.e. summer break between semester 4 and semester 5).

Note: 07 credits of the required 14 credits, under GE category, are exempted for Direct Second Year (DSY) students who will secure admission through lateral entry from the A.Y. 2023-24 onwards. Such students can opt for any courses from the above list to fulfil the required credits for the award of degree.

Honours/ Minor Degree courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ET70	Industry Interaction	15 (Total)	-	-	1	Break of Sem5 and Sem6
2	ET51T	Embedded C	2	-	-	2	6
3	ET51P	Embedded C Lab	-	1	-	1	6
4	ET53T	Advanced Machine Learning	2	-	-	2	6
5	ET53P	Advanced Machine Learning Lab	-	1	-	1	6
6	ET56T	Software defined radio	2	-	-	2	6
7	ET56P	Software defined radio Lab	-	1	-	1	6
8	ET67T	Multimedia systems	2	-	-	2	6
9	ET67P	Multimedia systems Lab	-	2	-	1	6
10	ET62T	Digital design with FPGA	2	-	-	2	6
11	ET62P	Digital design with FPGA Lab	-	2	-	1	6
12	ET68	Survey Report/Paper	30 (Total)	-	-	2	Break of Sem6 and Sem7
13	ET58T	Semiconductor memory design & testing	2	-	-	2	7
14	ET58P	Semiconductor memory design & testing Lab	-	2	-	1	7
15	ET52T	Embedded with Linux	2	-	-	2	7
16	ET52P	Embedded with Linux Lab	-	2	-	1	7
17	ET54T	Game Architecture and Programming	2	-	-	2	7
18	ET54P	Game Architecture and Programming Lab	-	2	-	1	7
19	ET55T	Adaptive Business Intelligence Systems	2	-	-	2	7
20	ET55P	Adaptive Business Intelligence Systems Lab	-	2	-	1	7
21	ET66T	Smart Antennas	2	-	-	2	7
22	ET66P	Smart Antennas Lab		2		1	7
23	ET69	Seminar	30 (Total)	-	-	2	Break of Sem7 and

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
							Sem8
24	ET57T	Passive Optical Networks	2	-	-	2	8
25	ET57P	Passive Optical Networks Lab	-	2	-	1	8
26	ET59T	Device Driver Programming	2	-	-	2	8
27	ET59P	Device Driver Programming Lab	-	2	-	1	8
28	ET60T	Augmented and Virtual Reality	2	-	-	2	8
29	ET60P	Augmented and Virtual Reality Lab	-	2	-	1	8
30	ET61T	Data Visualization	2	-	-	2	8
31	ET61P	Data Visualization Lab	-	2	-	1	8
32	ET63	Industrial Visit + Problem Definition Articulation +Proposal Presentation / Synopsis	2	2	-	3	8
33	ET64T	Capstone Project	2	-	-	2	8
34	ET64P	Capstone Project	-	2	-	1	8
35	ET65	MEMS	3	-	-	3	8

Course Structure and Assessment Guidelines

for

Bachelor of Technology

in

Electronics & Telecommunication Engineering

First Year B. Tech. Electronics & Telecommunication Engineering **Semester: I**

Course Structure and Assessment Guidelines

Course		Head of Learning	Credits	Assessment guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	**Name**			**ISA**	**MSE**	**ESE**	
HS01T	Effective Communication	Theory	2	15	20	40	075
HS01P	Effective Communication Lab	Practical	1	25	-	25	050
BS16T	Engineering Chemistry	Theory	2	15	20	40	075
BS16P	Engineering Chemistry Lab	Practical	1	25	-	25	050
BS02	Engineering Mathematics-I	Theory	3	20	30	50	100
ES02T	Engineering Mechanics	Theory	2	15	20	40	075
ES02P	Engineering Mechanics Lab	Practical	1	25	-	25	050
ES08T	Basic Electrical & Electronics Engineering	Theory	2	15	20	40	075
ES08P	Basic Electrical & Electronics Engineering Lab	Practical	1	25	-	25	050
ES04T	Structured Programming	Theory	2	15	20	40	075
ES04P	Structured Programming Lab	Practical	1	25	-	25	050
GEXX*	Any GE course	As per course	As per course				

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESE= End Semester Examination

*Selection based on the subset of GE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

First Year B. Tech. Electronics & Telecommunication Engineering **Semester: II**

Course Structure and Assessment Guidelines

Course		Head of Learning	Credits	Assessment guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	**Name**			**ISA**	**MSE**	**ESE**	
HS02T	Professional Skills	Theory	2	15	20	40	075
HS02P	Professional Skills Lab	Practical	1	25	-	25	050
BS15T	Engineering Physics	Theory	2	15	20	40	075
BS15P	Engineering Physics Lab	Practical	1	25	-	25	050
BS04	Engineering Mathematics-II	Theory	3	20	30	50	100
ES01T	Engineering Graphics	Theory	2	15	20	40	075
ES01P	Engineering Graphics Lab	Practical	1	25	-	25	050
ES09T	Logic Circuits	Theory	2	15	20	40	075
ES09P	Logic Circuits Lab	Practical	1	25	-	25	050
ES05T	Object-Oriented Programming	Theory	2	15	20	40	075
ES05P	Object-Oriented Programming Lab	Practical	1	25	-	25	050
GEXX*	Any two GE courses	As per course	As per course				
GEXX*		As per course	As per course				

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
*Selection based on the subset of GE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Second Year B. Tech. Electronics & Telecommunication Engineering **Semester: III**

Course Structure and Assessment Guidelines

Course		Head of Learning	Credits	Assessment guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	**Name**			**ISA**	**MSE**	**ESE**	
HS07	Technical Communication	Practical	1	50	-	-	050
BS33	Engineering Mathematics-III	Theory	3	20	30	50	100
ET05T	Microprocessor and Microcontrollers	Theory	3	20	30	50	100
ET05P	Microprocessor and Microcontrollers Lab	Practical	1	25	-	25	050
ET01T	Electronic Devices and Circuits	Theory	2	15	20	40	075
ET01P	Electronic Devices and Circuits Lab	Practical	1	25	-	25	050
ET02T	Principles of Communication Engineering	Theory	2	15	20	40	075
ET02P	Principles of Communication Engineering Lab	Practical	1	25	-	25	050
ET08	Instrumentation and Control Systems lab	Practical	1	25	-	25	050
ET04T	Network Theory and Transmission lines	Theory	3	20	30	50	100
ET04P	Network Theory and Transmission lines lab	Practical	1	25	-	25	050
ET17	Skill Based Lab	Practical	1	50	-	-	050

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
*Selection based on the subset of GE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Second Year B. Tech. Electronics & Telecommunication Engineering **Semester: IV**

Course Structure and Assessment Guidelines

Course		Head of Learning	Credits	Assessment guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	**Name**			**ISA**	**MSE**	**ESE**	
HS04	Presentation Skills	Practical	1	50	-	-	050
BS34T	Mathematical theory of Communication	Theory	3	20	30	50	100
BS34P	Mathematical theory of Communication Lab	Practical	1	25	-	25	050
ET07T	Data Structures and Analysis of Algorithms	Theory	2	15	20	40	075
ET07P	Data Structures and Analysis of Algorithms Lab	Practical	1	25	-	25	050
ET06T	Integrated Circuits	Theory	2	15	20	40	075
ET06P	Integrated Circuits Lab	Practical	1	25	-	25	050
ET09T	Digital Communication	Theory	2	15	20	40	075
ET09P	Digital Communication Lab	Practical	1	25	-	25	050
ET03T	Signal and systems	Theory	3	20	30	50	100
ET03P	Signal and systems Lab	Practical	1	25	-	25	050
ET45	Mini Project 1 (Hardware)	Practical	2	25	-	25	050
GEXXX*	Any GE course	As per course	As per course				

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
*Selection based on the subset of GE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Second Year B. Tech. Electronics & Telecommunication Engineering - Summer Break

Internships with other reputed institutes equivalent to 4 credits is **recommended** to be done by learner during second year inter semester break (i.e. summer break between 4 and semester 5).

Sr. No.	Course			Credits	Assessment Guidelines (Marks)		Total marks (Passing@40% of total marks)
	Code	Head of Learning	Course Name		Internal	External	
1	GEE01$	Practical	Internship with other Institutes (Credit Transfer)	4	As per Internal and External Guide		

If learner do not opt for this internship then he or she has to take two GE courses of 2 credits each in higher semesters (5 to 8) to fulfil the required credits for the award of degree.

Third Year B. Tech. Electronics & Telecommunication Engineering **Semester: V**

Course Structure and Assessment Guidelines

Course		Head of Learning	Credits	Assessment guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	**Name**			**ISA**	**MSE**	**ESE**	
ET18T	Digital VLSI	Theory	2	15	20	40	075
ET18P	Digital VLSI Lab	Practical	1	25	-	25	050
ET16T	Computer Communication Network	Theory	2	15	20	40	075
ET16P	Computer Communication Network Lab	Practical	1	25	-	25	050
ET10T	Digital Signal Processing	Theory	2	15	20	40	075
ET10P	Digital Signal Processing Lab	Practical	1	25	-	25	050
ET11T	Electromagnetics and Antenna	Theory	3	20	30	50	100
ET11P	Electromagnetics and Antenna Lab	Practical	1	25	-	25	050
ETXXT	Professional Elective-1	Theory	2	15	20	40	075
ETXXP	Professional Elective-1 Lab	Practical	1	25	-	25	050
ETXXT	Professional Elective-2	Theory	2	15	20	40	075
ETXXP	Professional Elective-2 Lab	Practical	1	25	-	25	050
ET46	Mini-Project 2	Practical	2	25	-	50	075

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
*Selection based on the subset of OE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Guidelines for Professional Elective Courses and Specialization Certificate – Refer Appendix-A

Important Note 1: Learners are required to go through the Appendix-A carefully before selecting the professional elective courses. Detailed guidelines regarding professional elective courses, specialization tracks and courses relevant to each track are given in Appendix-A. We have track A to C for professional elective1 and track D to F for professional elective 2. Track A is Communication, Track B – VLSI, Track D- Embedded System and IoT, Track E- AI/ML and Track F is Data Analytics. The learners can choose one track from each professional elective.

Professional Elective-1 & 2 courses (ETXX)

Course Code	Track	Course Name	Specialization Track Name #
Professional Elective-1			
ET20T	A	Digital System Design using Verilog and FPGA	VLSI
ET20P		Digital System Design using Verilog and FPGA Lab	
ET21T	B	Advanced Communication	Communication
ET21P		Advanced Communication Lab	
ET22T	C	Power Electronics	Other
ET22P		Power Electronics Lab	
Professional Elective-2			
ET31T	D	Sensor Technology	Embedded Systems & IoT
ET31P		Sensor Technology Lab	
ET32T	E	Machine Learning	AI/ML
ET32P		Machine Learning Lab	
ET33T	F	Database Management System	Data Analytics
ET33T		Database Management System Lab	
ET34T	G	Computer Graphics	Other
ET34P		Computer Graphics Lab	

For details of Specialization Certificate, refer Appendix - A

Guidelines for Award of Honours/ Minor Degree – Refer Appendix-B

Important Note 2: Before the end of Semester 5, learners are required to go through the Appendix-B carefully to opt for Honours/ Minor Degree Programme. Detailed guidelines regarding the Honours/ Minor degree programmes of all the departments, Eligibility criterion and Credit requirements are given in Appendix-B. Courses relevant to Honours/ Minor Degree Programmes offered by Department of Electronics & Telecommunication Engineering are given in Appendix-C.

Third Year B. Tech. Electronics & Telecommunication Engineering **Semester: VI**

Course Structure and Assessment Guidelines

Course		Head of Learning	Credits	Assessment guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	Name			ISA	MSE	ESE	
HS08	Engineering Economics	Theory	2	15	20	40	075
ET14T	Mobile Communication	Theory	2	15	20	40	075
ET14P	Mobile Communication Lab	Practical	1	25	-	25	050
ET19T	Digital Image Processing	Theory	2	15	20	40	075
ET19P	Digital Image Processing Lab	Practical	1	25	-	25	050
OEXX	Any one from the offered Open Elective courses	Theory	3	20	30	50	100
OEXX	Any one from the offered Open Elective courses	Theory	3	20	30	50	100
ETXXT	Professional Elective-3	Theory	2	15	20	40	075
ETXXP	Professional Elective-3 Lab	Practical	1	25	-	25	050
ETXXT	Professional Elective-4	Theory	2	15	20	40	075
ETXXP	Professional Elective-4 Lab	Practical	1	25	-	25	050

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
*Selection based on the subset of OE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

List of Professional Elective 3 & 4 Courses (ETXX)

Course Code	Track	Course Name	Specialization Track Name #
Professional Electives 3			
ET23T	A	ASIC and Verification	VLSI
ET23P		ASIC and Verification Lab	
ET24T	B	Software Defined Radio	Communication
ET24P		Software Defined Radio Lab	
ET25T	C	High Performance Computer Architecture	Other
ET25P		High Performance Computer	

		Architecture Lab	
Professional Electives 4			
ET35T	D	IoT and Industry 4.0	Embedded Systems & IoT
ET35P		IoT and Industry 4.0 Lab	
ET36T	E	Soft Computing	AI/ML
ET36P		Soft Computing Lab	
ET37T	F	Data Mining	Data Analytics
ET37P		Data Mining Lab	
ET38T	G	Operating System	Other
ET38P		Operating System Lab	

#For details of Specialization Certificate, refer Appendix-A

Third Year B. Tech. Electronics & Telecommunication Engineering - Summer Break

Sr. No.	Course			Credits	Assessment Guidelines (Marks)		Total marks (Passing@40% of total marks)
	Code	Head of Learning	Course Name		Internal	External	
1	ET47	Practical	Industry Internship	4	As per Internal and External Guide		

Final Year B. Tech. Electronics & Telecommunication Engineering **Semester: VII**

Course Structure and Assessment Guidelines

Course		Head of Learning	Credits	Assessment guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	Name			ISA	MSE	ESE	
ET12T	RF and Microwave Engineering	Theory	3	20	30	50	100
ET12P	RF and Microwave Engineering Lab	Practical	1	25	-	25	050
OEXX	Any one from the offered Open Elective courses	Theory	3	20	30	50	100
ETXXT	Professional Elective-5	Theory	2	15	20	40	075
ETXXP	Professional Elective-5 Lab	Practical	1	25	-	25	050
ETXXT	Professional Elective-6	Theory	2	15	20	40	075
ETXXP	Professional Elective-6 Lab	Practical	1	25	-	25	050
ET48	Project 1 (Synopsis)	Theory	3	50	-	50	100

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
*Selection based on the subset of OE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

List of Professional Elective 5 & 6 Courses (ETXX)

Course Code	Track	Course Name	Specialization Track Name
Professional Electives 5			
ET26T	A	Analog IC Design	VLSI
ET26P		Analog IC Design	
ET27T	B	Satellite Communication	Communication
ET27P		Satellite Communication	
ET28T	B	Telecommunication Network Management	
ET28P		Telecommunication Network Management	
ET29T	C	Robotics	Other
ET29P		Robotics Lab	
Professional Electives 6			
ET39T	D	Advanced Embedded Systems	Embedded Systems & IoT
ET39P		Advanced Embedded Systems	

		Lab	
ET40T	E	Deep Learning	AI/ML
ET40P		Deep Learning Lab	
ET41T	F	Big Data Analytics	Data Analytics
ET41P		Big Data Analytics Lab	
ET42T	G	Cloud Computing	Other
ET42P		Cloud Computing Lab	

#For details of Specialization Certificate, refer Appendix-A

Final Year B. Tech. Electronics & Telecommunication Engineering **Semester: VIII**

Course Structure and Assessment Guidelines

Course		Head of Learning	Credits	Assessment guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	**Name**			**ISA**	**MSE**	**ESE**	
ET13T	Optical Communication	Theory	2	15	20	40	075
ET13P	Optical Communication Lab	Practical	1	25	-	25	050
OEXX	Any one from the offered Open Elective courses	Theory	3	20	30	50	100
OEXX	Any one from the offered Open Elective courses	Theory	3	20	30	50	100
ET49	Project 2- (Final)	Practical	4	75	-	50	125

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
*Selection based on the subset of OE courses made available by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Appendix-A

Guidelines for Professional Elective Courses and Specialization Certificate

Professional Elective courses are designed to meet industrial requirements. All learners must opt for 6 professional elective courses (both theory and practical components) as a part of requirement for B.Tech. degree.

Specialization Certificate is introduced in order to build competency of learners in the chosen domain. Department of Electronics & Telecommunication Engineering offer the following specialization tracks:

Professional Electives	Track	Specialization Track Name
One (Core)	A	Communication
	B	VLSI
	C	Other
Two (Multidisciplinary)	D	Embedded Systems & IoT
	E	AI/ML
	F	Data Analytics
	G	Other

We are offering two professional electives from semester 5 to 7. Professional Elective 1 consists of core courses and Professional Elective 2 consists of multidisciplinary courses. The learner must choose one course from each elective to fulfil the required credits for the award of degree.
The courses offered under elective 1 are categorised into 3 tracks, VLSI (A), Communication (B), and Other (C). Similarly, courses offered under elective 2 are categorised into 4 tracks, Embedded Systems & IoT (D), AI/ML (E), Data Analytics (F) and Other (G).

Learners can take courses from any track. **However, if learners complete all Professional Elective courses from the same chosen track, they will be eligible to receive a Specialization Certificate from the Institute.**

Learners who choose professional elective courses from different specialisation tracks or from tracks C or G (labelled as other) will not be eligible for a Specialization Certificate.

It should be noted that there are no additional credit requirements for these specialisations.

Professional Elective 1:
Communication: Courses to be chosen for specialization in VLSI Track (A)

Semester	Course Code	Course Name
V	ET20T	Digital System Design using Verilog and FPGA
	ET20P	Digital System Design using Verilog and FPGA Lab
VI	ET23T	ASIC and Verification
	ET23P	ASIC and Verification Lab
VII	ET26T	Analog IC Design
	ET26P	Analog IC Design

VLSI: Courses to be chosen for specialization in Communication Track (B)

Semester	Course Code	Course Name
V	ET21T	Advanced Communication
	ET21P	Advanced Communication Lab
VI	ET24T	Software Defined Radio
	ET24P	Software Defined Radio Lab
VII	ET27T	Satellite Communication
	ET27P	Satellite Communication
	ET28T	Telecommunication Network Management
	ET28P	Telecommunication Network Management

Track Other (C)

Semester	Course Code	Course Name
V	ET22T	Power Electronics
	ET22P	Power Electronics Lab
VI	ET25T	High Performance Computer Architecture
	ET25P	High Performance Computer Architecture Lab
VII	ET29T	Robotics
	ET29P	Robotics Lab

Professional Elective 2:

Embedded systems and IoT: Courses to be chosen for specialization in Embedded systems and IoT Track (D)

Semester	Course Code	Course Name
V	ET31T	Sensor Technology
	ET31P	Sensor Technology Lab
VI	ET35T	IoT and Industry 4.0
	ET35P	IoT and Industry 4.0 Lab
VII	ET39T	Advanced Embedded Systems
	ET39P	Advanced Embedded Systems Lab

AI/ML: Courses to be chosen for specialization in AI/ML Track (E)

Semester	Course Code	Course Name
V	ET32T	Machine Learning
	ET32P	Machine Learning Lab
VI	ET36T	Soft Computing
	ET36P	Soft Computing Lab
VII	ET40T	Deep Learning
	ET40P	Deep Learning Lab

Data Analytics: Courses to be chosen for specialization in Data Analytics Track (F)

Semester	Course Code	Course Name
V	ET33T	Database Management System
	ET33P	Database Management System Lab

VI	ET37T	Data Mining
	ET37P	Data Mining Lab
VII	ET41T	Big Data Analytics
	ET41P	Big Data Analytics Lab

Track Other (G)

Semester	Course Code	Course Name
V	ET34T	Computer Graphics
	ET34P	Computer Graphics Lab
VI	ET38T	Operating System
	ET38P	Operating System Lab
VII	ET42T	Cloud Computing
	ET42P	Cloud Computing Lab

Appendix-B

Guidelines for Award of Honours/ Minor Degree Programme

Honours and Minor Degree programme is introduced in order to facilitate learners to enhance the depth of knowledge, diversity, breadth and skills in emerging fields. An Honours or Minor degree typically refers to a higher level of academic achievement either for research orientation or for improving employability. Learners can select any Honours or Minor degree programme as per his/her choice.

In our curriculum, learners can choose to avail Honours/ Minor Degree programme by completing requirements of 18 credits, which will be over and above the minimum credits required for B.Tech. degree i.e. credit requirement for the award of degree programme and Honours/ Minor degree programme are required to be explicitly carried out. Learners shall opt for Honours or Minor specialisations during the break of Semester 5 and Semester 6. **Learners may complete the B.Tech. degree programme without opting for Honours or Minor degree programme** i.e. opting for Honours/ Minor Degree programme is not mandatory as a part of B.Tech. degree programme.

For Honours degree, learner shall select Honour programme offered by his/her own department. Alternatively, for Minor degree, learner shall select Honour programme offered by any other department.

Eligibility Criteria

- All students are eligible to apply for Honours/ Minor degree programmes
- If student has already completed any course(s) that is listed in the chosen Honours/ Minor degree programme, as additional learning course(s), then the transfer credits for such course(s) shall be carried out towards Honours/ Minor degree programme.
- For a student to get Honours/ Minor degree, it is mandatory that the student completes the relevant courses before graduating.

Syllabus Scheme Template

Sr. No.	Course			Preferred Semester	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Head of Learning	Name			ISA	MSE	ESE	
1	XXXX	Theory	Industry Interaction	Break of Sem5 and Sem6	1	25	-	-	025
2	XXXX	Theory	Honours / Minor Degree Course 1	6	2	15	20	40	075
		Practical	Honours / Minor Degree	6	1	25	-	25	050

			Course 1 Lab						
3	XXXX	Theory	Survey Report/ Paper	Break of Sem6 and Sem7	2	25	-	25	050
4	XXXX	Theory	Honours / Minor Degree Course 2	7	2	15	20	40	075
		Practical	Honours / Minor Degree Course 2 Lab	7	1	25	-	25	050
5	XXXX	Theory	Seminar	Break of Sem7 and Sem8	2	25	-	25	050
6	XXXX	Theory	Honours / Minor Degree Course 3	8	2	15	20	40	075
		Practical	Honours / Minor Degree Course 3 Lab	8	1	25	-	25	050
7	XXXX	Practical	Capstone Project	8	4	75	-	50	125

Honours/ Minor Degree Programmes offered by all departments

Sr.No.	Honours/ Minor Degree Programme	Department offering Honours	Department offering Minor
1	Data Analytics	• Information Technology	• Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
2	Social Media Insights	• Information Technology	• Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
3	Advanced IoT	• Information Technology	• Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
4	Advanced Cyber Security	• Information Technology	• Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication

			• Biomedical
5	Intelligent Game Development	• Computer Engineering	• Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
6	Data Science and Machine Learning	• Computer Engineering	• Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
7	Artificial Intelligence and Data Analysis	• Computer Engineering	• Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
8	Data Science and Forecasting	• Computer Engineering	• Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
9	Smart City Management	• Computer Engineering	• Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
10	Cyber Forensic and Penetration	• Computer Engineering	• Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
11	Crypto Currency	• Computer Engineering	• Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical
12	Intelligent Game Development	• Electronics and Computer Science	• Information Technology • Computer Engineering • Electronics and Telecommunication • Biomedical
13	Data Engineering	• Electronics and Computer Science	• Information Technology • Computer Engineering • Electronics and Telecommunication • Biomedical
14	Smart City-Design and Development	• Electronics and Computer Science	• Information Technology • Computer Engineering • Electronics and Telecommunication • Biomedical
15	Electronic Product Development	• Electronics and Computer Science	• Information Technology • Computer Engineering • Electronics and Telecommunication • Biomedical
16	Advanced Embedded System	• Electronics and Telecommunication	• Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical
17	Intelligent Game	• Electronics and	• Information Technology

	Development	Telecommunication	• Computer Engineering • Electronics and Computer Science • Biomedical
18	Sentiment Analytics and Data Forecasting	• Electronics and Telecommunication	• Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical
19	Advanced Communication Technology	• Electronics and Telecommunication	• Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical
20	Advanced VLSI Technology	• Electronics and Telecommunication	• Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical
21	AI in Healthcare	• Biomedical	• Information Technology • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication
22	Medical IOT	• Biomedical	• Information Technology • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication
23	Medical Imaging Technology	• Biomedical	• Information Technology • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication

Detailed list of courses under each Honours/ Minor Degree Programme:

- Electronics & Telecommunication Department learners can refer to the list of Honours Degree Programme and their corresponding courses in the Appendix-C.
- Learners of Electronics & Telecommunication Department who wish to opt for Minor Degree Programme offered by other department can obtain details of these programmes from Appendix-C of the respective department.

Appendix-C

Honours/ Minor Degree Programmes offered by Department of Electronics & Telecommunication Engineering

Department of Electronics & Telecommunication Engineering offers the below listed Honours degree programme for learners of Electronics & Telecommunication Engineering. These programmes can be availed as Minor degree programme by learners of other departments of the Institute.

1. Advanced Embedded Systems
2. Intelligent Game Development
3. Sentiment Analysis & Data Forecasting
4. Advanced Communication Technology
5. Advanced VLSI Technology

Courses to be successfully completed as a part of Honours/ Minor Degree Programme

1. Advanced Embedded Systems

Semester	Course Code	Course Name
VI	ET51	Embedded C
VII	ET52	Embedded with Linux
VII	ET59	Device Driver Programming

2. Intelligent Game Development

Semester	Course Code	Course Name
VI	ET67	Multimedia System
VII	ET54	Game Architecture and Programming
VII	ET60	Augmented and Virtual Reality

3. Sentiment Analysis & Data Forecasting

Semester	Course Code	Course Name
VI	ET53	Advanced Machine Learning
VII	ET55	Adaptive Business Intelligence Systems
VII	ET61	Data Visualization

4. Advanced Communication Technology

Semester	Course Code	Course Name
VI	ET56	Software defined radio
VII	ET57	Passive Optical Networks
VII	ET66	Smart Antennas

5. Advanced VLSI Technology

Semester	Course Code	Course Name
VI	ET65	MEMS

VII	ET58	Semiconductor memory design & testing
VII	ET62	Digital design with FPGA