Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

Bachelor of Technology

in

Electronics & Telecommunication Engineering

Programme Structure (R-2022)

(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. The autonomous 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)**. The 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 are 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 the 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 learners capable of working 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 Honours/Minor degree that involves field/ domain study. Learner can avail themselves of this degree by completing requirement of additional 18 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	Industry Interaction	1
3	Survey Report/ Paper	2
4	Seminar	2
5	Capstone Project-I	4
Total		**18**

For details of add on Honours/Minor degree refer to Honours/Minor degree document of B.Tech. Electronics and Telecommunication Engineering program applicable for R-2022 curriculum.

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.**

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

		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.**

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	3	-	-	3	8
25	ET13P	Optical Communication Lab	-	2	-	1	8
26	ET14T	Mobile Communication System	2	-	-	2	6
27	ET14P	Mobile Communication System 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	Basic VLSI Design	2	-	-	2	5
32	ET18P	Basic VLSI Design Lab	-	2	-	1	5
33	ET19T	Digital Image Processing	2	-	-	2	6
34	ET19P	Digital Image Processing Lab	-	2	-	1	6

IV. Professional Elective Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		

1	ET20T	Modelling and Analysis of Communication System	2	-	-	2	5
2	ET20P	Modelling and Analysis of Communication System Lab	-	2	-	1	5
3	ET21T	Telecommunication Network Management	2	-	-	2	6
4	ET21P	Telecommunication Network Management Lab	-	2	-	1	6
5	ET22T	Tracking System	2	-	-	2	6
6	ET22P	Tracking System Lab	-	2	-	1	6
7	ET23T	OFDM and MIMO Technology	2	-	-	2	7
8	ET23P	OFDM and MIMO Technology Lab	-	2	-	1	7
9	ET24T	Satellite Communication	2	-	-	2	7
10	ET24P	Satellite Communication Lab	-	2	-	1	7
11	ET25T	Wireless sensor networks	2	-	-	2	7
12	ET25P	Wireless sensor networks Lab	-	2	-	1	7
13	ET26T	Database Management System	2	-	-	2	5
14	ET26P	Database Management System Lab	-	2	-	1	5
15	ET27T	Introduction to Data Analytics	2	-	-	2	6
16	ET27P	Introduction to Data Analytics Lab	-	2	-	1	6
17	ET28T	Machine Learning	2	-	-	2	6
18	ET28P	Machine Learning Lab	-	2	-	1	6
19	ET29T	Data Mining	2	-	-	2	7
20	ET29P	Data Mining Lab	-	2	-	1	7
21	ET30T	Big data Analytics	2	-	-	2	7
22	ET30P	Big data Analytics Lab	-	2	-	1	7
23	ET31T	Deep Learning	2	-	-	2	7
24	ET31P	Deep Learning Lab	-	2	-	1	7
25	ET32T	Modern Sensors for Internet of Thing	2	-	-	2	5
26	ET32P	Modern Sensors for Internet of Thing Lab	-	2	-	1	5
27	ET33T	Principles of Internet of Things (IoT)	2	-	-	2	6
28	ET33P	Principles of Internet of Things (IoT)Lab	-	2	-	1	6
29	ET34T	Embedded System Design	2	-	-	2	6

		with Tiny Operating System (OS)					
30	ET34P	Embedded System Design with Tiny Operating System Lab	-	2	-	1	6
31	ET35T	Internet of Things (IoT) and Edge Computing	2	-	-	2	7
32	ET35P	Internet of Things (IoT) and Edge Computing Lab	-	2	-	1	7
33	ET36T	Internet of Things (IoT) Security and Trust	2	-	-	2	7
34	ET36P	Internet of Things (IoT) Security and Trust Lab	-	2	-	1	7
35	ET37T	Industrial Internet of Things (IIoT)	2	-	-	2	7
36	ET37P	Industrial Internet of Things (IIoT) Lab	-	2	-	1	7
37	ET38T	Digital System Design	2	-	-	2	5
38	ET38P	Digital System Design Lab	-	2	-	1	5
39	ET39T	Advanced VLSI Design and Technology	2	-	-	2	6
40	ET39P	Advanced VLSI Design and Technology Lab	-	2	-	1	6
41	ET40T	Analog IC Design	2	-	-	2	6
42	ET40P	Analog IC Design Lab	-	2	-	1	6
43	ET41T	ASIC and Verification	2	-	-	2	7
44	ET41P	ASIC and Verification Lab	-	2	-	1	7
45	ET42T	System on Chip	2	-	-	2	7
46	ET42P	System on Chip Lab	-	2	-	1	7
47	ET43T	Mixed signal VLSI	2	-	-	2	7
48	ET43P	Mixed signal VLSI Lab	-	2	-	1	7

V. Open Elective Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	OE21	Cyber Law	3	-	-	3	6 to 8
2	OE22	Project Management	3	-	-	3	6 to 8
3	OE23	Product Lifecycle Management	3	-	-	3	6 to 8
4	OE24	Sustainability Management	3	-	-	3	6 to 8
5	OE25	Operation Research	3	-	-	3	6 to 8
6	OE26	IPR and Patenting	3	-	-	3	6 to 8
7	OE27	Research Methodology	3	-	-	3	6 to 8
8	OE28	Renewable Energy	3	-	-	3	6 to 8

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
		Management					
9	OE29	Energy Audit and Management	3	-	-	3	6 to 8
10	OE30	Bioinformatics	3	-	-	3	6 to 8
11	OE31	Nanotechnology	3	-	-	3	6 to 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	Break after Sem. 6
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.**

VIII. General Education

Arts	A
Social and Behavioural 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
GECI01T	Design Thinking	2
GECI01P	Design Thinking Lab	1
GECI02	Innovation and Entrepreneurship	2
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. Such students can opt for any courses from the above list to fulfil the required credits for the award of degree.

Course Structure and Assessment Guidelines

for

Bachelor of Technology

in

Electronics & Telecommunication Engineering

First Year B. Tech. Electronics & Telecommunication Engineering **Preferred 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 from below list	Theory	2	As per course			
Total			**20**				

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.

List of General Education Elective Courses (GEXX)

Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	Name			ISA	MSE	ESE	
GEA01	Voice Culture for Professional Speaking	Theory	2	25	-	50	075
GEA02	Various Dance Forms	Theory	2	25	-	50	075
GEA03	Exploring Indian Art	Theory	2	25	-	50	075
GESB02	Universal Human Values	Theory	2	25	-	50	075
GESB03	Indian Traditional Knowledge System	Theory	2	25	-	50	075
GESB04	Corporate and Social Etiquettes	Theory	2	25	-	50	075
GESB05	Global Citizenship Education	Theory	2	25	-	50	075
GESB06	Responsibility towards sustainable environment	Theory	2	25	-	50	075
GESB07	Psychology	Theory	2	25	-	50	075
GECI02	Innovation and Entrepreneurship	Theory	2	25	-	50	075
GEPS01	Indian Constitution	Theory	2	25	-	50	075
GEPS02	Four Pillars of Democratic Nation	Theory	2	25	-	50	075
GEPEW01	Wellness – Body, Mind & Spirit	Theory	2	25	-	50	075
GEPEW02	IQ vs EQ	Theory	2	25	-	50	075
GEPEW03	Nutrition and Physical Wellness	Theory	2	25	-	50	075
GEF01	Basics of Finance & Legal aspects for Business	Theory	2	25	-	50	075
GEF02	Financial Management for beginners	Theory	2	25	-	50	075
GENS01	Facets of Astronomy	Theory	2	25	-	50	075
GENS02	Modern Farming	Theory	2	25	-	50	075
GEWI01	Railways - Wonders of Infrastructure	Theory	2	25	-	50	075

First Year B. Tech. Electronics & Telecommunication Engineering Preferred 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
GECI01T	Design Thinking	Theory	2	15	20	40	075
GECI01P	Design Thinking Lab	Practical	1	25	-	25	050
GEXX*	Any one GE courses from below list	Theory	2	As per course			
Total		**23**					

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.

List of General Education Elective Courses (GEXX)

Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	Name			ISA	MSE	ESE	
GEA01	Voice Culture for Professional Speaking	Theory	2	25	-	50	075
GEA02	Various Dance Forms	Theory	2	25	-	50	075
GEA03	Exploring Indian Art	Theory	2	25	-	50	075
GESB02	Universal Human Values	Theory	2	25	-	50	075
GESB03	Indian Traditional Knowledge System	Theory	2	25	-	50	075
GESB04	Corporate and Social Etiquettes	Theory	2	25	-	50	075
GESB05	Global Citizenship Education	Theory	2	25	-	50	075
GESB06	Responsibility towards sustainable environment	Theory	2	25	-	50	075
GESB07	Psychology	Theory	2	25	-	50	075
GECI02	Innovation and Entrepreneurship	Theory	2	25	-	50	075
GEPS01	Indian Constitution	Theory	2	25	-	50	075
GEPS02	Four Pillars of Democratic Nation	Theory	2	25	-	50	075
GEPEW01	Wellness – Body, Mind & Spirit	Theory	2	25	-	50	075
GEPEW02	IQ vs EQ	Theory	2	25	-	50	075
GEPEW03	Nutrition and Physical Wellness	Theory	2	25	-	50	075
GEF01	Basics of Finance & Legal aspects for Business	Theory	2	25	-	50	075
GEF02	Financial Management for beginners	Theory	2	25	-	50	075
GENS01	Facets of Astronomy	Theory	2	25	-	50	075
GENS02	Modern Farming	Theory	2	25	-	50	075
GEWI01	Railways - Wonders of Infrastructure	Theory	2	25	-	50	075

Second Year B. Tech. Electronics & Telecommunication Engineering **Preferred 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
		Total	**20**				

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

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 **Preferred 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	25	-	25	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	-	50	075
GESB01[#]	Social Service Internship/ Project	Theory	3	-	-	100	100
Total			**23**				

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

[#] **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)

NOTE: As per Institute guidelines, the results of courses completed in inter-semester break will appear in the marksheet of the next 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 and Telecommunication Engineering - Summer Break

Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40 % of total marks)
Code	Name			ISA	MSE	ESE	
GE01[$]	Internship with other Institutes (Credit Transfer)	As per course	4	125	-	-	125

[$] **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: As per Institute guidelines, the results of courses completed in inter-semester break will appear in the marksheet of the next semester.

Third Year B. Tech. Electronics & Telecommunication Engineering **Preferred 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	Basic VLSI Design	Theory	2	15	20	40	075
ET18P	Basic VLSI Design Lab	Practical	1	25	-	25	050
ET16T	Computer Networks	Theory	2	15	20	40	075
ET16P	Computer Networks 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
ET46	Mini-Project 2	Practical	2	25	-	50	075
		Total	**18**				
Credits completed in previous inter semester break course that will appear in this semester marksheet							
GE01	Internship with other Institutes (Credit Transfer)	Theory	4	125	-	-	125

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

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.

List of Professional Elective-1 courses (ETXX):

Specialization Track Name[#]	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Communication Engineering (CE)	ET20T	Modelling and Analysis of Communication System	Theory	2	15	20	40	075
	ET20P	Modelling and Analysis of Communication System Lab	Practical	1	25	-	25	050
Data Analytics and Machine Learning (DAML)	ET26T	Database Management System	Theory	2	15	20	40	075
	ET26P	Database Management System Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	ET32T	Modern Sensors for Internet of Things	Theory	2	15	20	40	075
	ET32P	Modern Sensors for Internet of Things Lab	Practical	1	25	-	25	050
Very Large-Scale Integration (VLSI)	ET38T	Digital System Design	Theory	2	15	20	40	075
	ET38P	Digital System Design Lab	Practical	1	25	-	25	050

[#] For details of Specialization Certificate, refer Appendix - A

Guidelines for Honours/Minors Degree

Before the end of Semester 5, learners are required to go through the Honours/ Minor Degree Programme document carefully to opt for Honours/ Minor Degree Programme. Learners willing to opt for Honours/ Minor degree programme are required to satisfy the eligibility criteria stated in the document.

Third Year B. Tech. Electronics & Telecommunication Engineering **Preferred 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 System	Theory	2	15	20	40	075
ET14P	Mobile Communication System 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 two from the offered Open Elective courses	Theory	3	20	30	50	100
OEXX*		Theory	3	20	30	50	100
ETXXT	Professional Elective-2	Theory	2	15	20	40	075
ETXXP	Professional Elective-2 Lab	Practical	1	25	-	25	050
ETXXT	Professional Elective-3	Theory	2	15	20	40	075
ETXXP	Professional Elective-3 Lab	Practical	1	25	-	25	050
		Total	**20**				

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-2 courses (ETXX):

Specialization Track Name#	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	**Name**			**ISA**	**MSE**	**ESE**	
Communication Engineering (CE)	ET21T	Telecommunication Network Management	Theory	2	15	20	40	075

	ET21P	Telecommunication Network Management Lab	Practical	1	25	-	25	050
Data Analytics and Machine Learning (DAML)	ET27T	Introduction to Data Analytics	Theory	2	15	20	40	075
	ET27P	Introduction to Data Analytics Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	ET33T	Principles of Internet of Things	Theory	2	15	20	40	075
	ET33P	Principles of Internet of Things Lab	Practical	1	25	-	25	050
Very Large-Scale Integration (VLSI)	ET39T	Advanced VLSI Design and Technology	Theory	2	15	20	40	075
	ET39T	Advanced VLSI Design and Technology lab	Practical	1	25	-	25	050

[#]For details of Specialization Certificate, refer Appendix-A

List of Professional Elective-3 courses (ETXX):

Specialization Track Name[#]	**Course**		**Head of Learning**	**Credits**	**Assessment Guidelines (Marks)**			**Total marks (Passing@40% of total marks)**
	Code	**Name**			**ISA**	**MSE**	**ESE**	
Communication Engineering (CE)	ET22T	Tracking System	Theory	2	15	20	40	075
	ET22P	Tracking System Lab	Practical	1	25	-	25	050
Data Analytics and Machine Learning (DAML)	ET28T	Machine Learning	Theory	2	15	20	40	075
	ET28P	Machine Learning Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	ET34T	Embedded Systems Design and Tiny OS	Theory	2	15	20	40	075
	ET34P	Embedded Systems Design and Tiny OS Lab	Practical	1	25	-	25	050
Very Large-Scale Integration (VLSI)	ET40T	Analog IC Design	Theory	2	15	20	40	075
	ET40P	Analog IC Design Lab	Practical	1	25	-	25	050

[#]For details of Specialization Certificate, refer Appendix-A

List of Open Elective Courses (OEXX):

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	OE21	Cyber Law	3	-	-	3	6 to 8
2	OE22	Project Management	3	-	-	3	6 to 8
3	OE23	Product Lifecycle Management	3	-	-	3	6 to 8
4	OE24	Sustainability Management	3	-	-	3	6 to 8
5	OE25	Operation Research	3	-	-	3	6 to 8
6	OE26	IPR and Patenting	3	-	-	3	6 to 8
7	OE27	Research Methodology	3	-	-	3	6 to 8
8	OE28	Renewable Energy Management	3	-	-	3	6 to 8
9	OE29	Energy Audit and Management	3	-	-	3	6 to 8
10	OE30	Bioinformatics	3	-	-	3	6 to 8
11	OE31	Nanotechnology	3	-	-	3	6 to 8

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

Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	Name			ISA	MSE	ESE	
ET47*	Industry Internship	Practical	4	50	-	75	125

*120+ hours of industry internship to be done during inter semester break between semester 6 and semester 7.

NOTE: As per Institute guidelines, the results of courses completed in inter-semester break will appear in the marksheet of the next semester.

Final Year B. Tech. Electronics & Telecommunication Engineering Preferred 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-4	Theory	2	15	20	40	075
ETXXP	Professional Elective-4 Lab	Practical	1	25	-	25	050
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
		Total	**19**				
Credits completed in previous inter semester break course that will appear in this semester marksheet							
ET47	Industry Internship	Practical	4	50	-	75	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.

List of Professional Elective-4 courses (ETXX):

Specialization Track Name#	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	**Name**			**ISA**	**MSE**	**ESE**	
Communication Engineering (CE)	ET23T	OFDM and MIMO Technology	Theory	2	15	20	40	075
	ET23P	OFDM and MIMO Technology Lab	Practical	1	25	-	25	050

Data Analytics and Machine Learning (DAML)	ET29T	Data Mining	Theory	2	15	20	40	075
	ET29P	Data Mining Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	ET35T	Internet of Things and Edge Computing	Theory	2	15	20	40	075
	ET35P	Internet of Things and Edge Computing Lab	Practical	1	25	-	25	050
Very Large Scale Integration (VLSI)	ET41T	ASIC and Verification	Theory	2	15	20	40	075
	ET41P	ASIC and Verification Lab	Practical	1	25	-	25	050

#For details of Specialization Certificate, refer Appendix-A

List of Professional Elective-5 courses (ETXX):

Specialization Track Name#	**Course**		**Head of Learning**	**Credits**	**Assessment Guidelines (Marks)**			**Total marks (Passing@40% of total marks)**
	Code	**Name**			**ISA**	**MSE**	**ESE**	
Communication Engineering (CE)	ET24T	Satellite Communication	Theory	2	15	20	40	075
	ET24P	Satellite Communication Lab	Practical	1	25	-	25	050
Data Analytics and Machine Learning (DAML)	ET30T	Big Data Analytics	Theory	2	15	20	40	075
	ET30P	Big Data Analytics Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	ET36T	Internet of Things Security and Trust	Theory	2	15	20	40	075
	ET36P	Internet of Things Security and Trust Lab	Practical	1	25	-	25	050
Very Large-Scale Integration (VLSI)	ET42T	System on Chip	Theory	2	15	20	40	075
	ET42P	System on Chip Lab	Practical	1	25	-	25	050

#For details of Specialization Certificate, refer Appendix-A

List of Professional Elective-6 courses (ETXX):

Specialization Track Name[#]	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Communication Engineering (CE)	ET25T	Wireless Sensor Networks	Theory	2	15	20	40	075
	ET25P	Wireless Sensor Networks Lab	Practical	1	25	-	25	050
Data Analytics and Machine Learning (DAML)	ET31T	Deep Learning	Theory	2	15	20	40	075
	ET31P	Deep Learning Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	ET37T	Industrial Internet of Things	Theory	2	15	20	40	075
	ET37P	Industrial Internet of Things Lab	Practical	1	25	-	25	050
Very Large-Scale Integration (VLSI)	ET43T	Mixed Signal VLSI	Theory	2	15	20	40	075
	ET43P	Mixed Signal VLSI Lab	Practical	1	25	-	25	050

[#]For details of Specialization Certificate, refer Appendix-A

List of Open Elective Courses (OEXX):

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	OE21	Cyber Law	3	-	-	3	6 to 8
2	OE22	Project Management	3	-	-	3	6 to 8
3	OE23	Product Lifecycle Management	3	-	-	3	6 to 8
4	OE24	Sustainability Management	3	-	-	3	6 to 8
5	OE25	Operation Research	3	-	-	3	6 to 8
6	OE26	IPR and Patenting	3	-	-	3	6 to 8
7	OE27	Research Methodology	3	-	-	3	6 to 8
8	OE28	Renewable Energy Management	3	-	-	3	6 to 8
9	OE29	Energy Audit and Management	3	-	-	3	6 to 8
10	OE30	Bioinformatics	3	-	-	3	6 to 8
11	OE31	Nanotechnology	3	-	-	3	6 to 8

Final Year B. Tech. Electronics & Telecommunication Engineering **Preferred 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	3	20	30	50	100
ET13P	Optical Communication Lab	Practical	1	25	-	25	050
OEXX*	Any two from the offered Open Elective courses	Theory	3	20	30	50	100
OEXX*		Theory	3	20	30	50	100
ET49	Project 2- (Final)	Practical	4	75	-	50	125
		Total	**14**				

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 Open Elective Courses (OEXX):

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	OE21	Cyber Law	3	-	-	3	6 to 8
2	OE22	Project Management	3	-	-	3	6 to 8
3	OE23	Product Lifecycle Management	3	-	-	3	6 to 8
4	OE24	Sustainability Management	3	-	-	3	6 to 8
5	OE25	Operation Research	3	-	-	3	6 to 8
6	OE26	IPR and Patenting	3	-	-	3	6 to 8
7	OE27	Research Methodology	3	-	-	3	6 to 8
8	OE28	Renewable Energy Management	3	-	-	3	6 to 8
9	OE29	Energy Audit and Management	3	-	-	3	6 to 8
10	OE30	Bioinformatics	3	-	-	3	6 to 8
11	OE31	Nanotechnology	3	-	-	3	6 to 8

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 to build competency of learners in the chosen domain. Department of Electronics & Telecommunication Engineering offers the following specialization tracks for the students of EXTC department:

Sr. No.	Specialization Track Name
1	Communication Engineering (CE)
2	Data Analytics and Machine Learning (DAML)
3	Internet of Things (IoT)
4	Very Large-Scale Integration (VLSI)

We are offering total six professional electives from semester 5 to 7. The learner must choose one course in semester 5, two courses in semester 6 and three courses in semester 7, from selected specialization track to fulfil the required credits for the award of degree.
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 will not be eligible for a Specialization Certificate.

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

Communication Engineering track: Courses to be chosen for specialization in Communication Engineering track

Semester	Course Code	Course Name
V	ET20T	Modelling and Analysis of Communication System
V	ET20P	Modelling and Analysis of Communication System Lab
VI	ET21T	Telecommunication Network Management
VI	ET21P	Telecommunication Network Management Lab
VI	ET22T	Tracking System
VI	ET22P	Tracking System Lab
VII	ET23T	OFDM and MIMO Technology
VII	ET23P	OFDM and MIMO Technology Lab
VII	ET24T	Satellite Communication
VII	ET24P	Satellite Communication Lab
VII	ET25T	Wireless sensor networks
VII	ET25P	Wireless sensor networks Lab

Data Analytics and Machine Learning track: Courses to be chosen for specialization in Data Analytics and Machine Learning

Semester	Course Code	Course Name
V	ET26T	Database Management System
V	ET26P	Database Management System Lab
VI	ET27T	Introduction to Data Analytics
VI	ET27P	Introduction to Data Analytics Lab
VI	ET28T	Machine Learning
VI	ET28P	Machine Learning Lab
VII	ET29T	Data Mining
VII	ET29P	Data Mining Lab
VII	ET30T	Big data Analytics
VII	ET30P	Big data Analytics Lab
VII	ET31T	Deep Learning
VII	ET31P	Deep Learning Lab

Internet of Things track: Courses to be chosen for specialization in Internet of Thing

Semester	Course Code	Course Name
V	ET32T	Modern Sensors for IOT
V	ET32P	Modern Sensors for IOT Lab
VI	ET33T	Principles of IOT
VI	ET33P	Principles of IOT Lab
VI	ET34T	Embedded System Design with tiny OS
VI	ET34P	Embedded System Design with tiny OS Lab
VII	ET35T	IoT and Edge Computing
VII	ET35P	IoT and Edge Computing Lab
VII	ET36T	IoT Security and Trust
VII	ET36P	IoT Security and Trust Lab
VII	ET37T	Industrial IOT
VII	ET37P	Industrial IOT Lab

Very Large-Scale Integration track: Courses to be chosen for specialization in Very Large-Scale Integration Design

Semester	Course Code	Course Name
V	ET38T	Digital System Design
V	ET38P	Digital System Design Lab
VI	ET39T	Advanced VLSI Design and Technology
VI	ET39P	Advanced VLSI Design and Technology Lab

VI	ET40T	Analog IC Design
VI	ET40P	Analog IC Design Lab
VII	ET41T	ASIC and Verification
VII	ET41P	ASIC and Verification Lab
VII	ET42T	System on Chip
VII	ET42P	System on Chip Lab
VII	ET43T	Mixed Signal VLSI
VII	ET43P	Mixed Signal VLSI Lab