



# Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

## Bachelor of Technology

in

## Electronics and Computer Science

## Programme Structure

(As per AICTE and NEP 2020 guidelines, with effect from the Academic Year 2023-24)

## Preamble

The National Education Policy (NEP) framework aims to break the mold from teacher centric to student centric educational practices. It empowers the students with flexibility in terms of choosing courses across different faculties and modes of learning.

This multidisciplinary approach will encourage learners to follow their passion and inherent interests. The learner is free to learn at a pace that he is comfortable with, and this enables lifelong learning. It also enhances the scope for holistic personality development.

This premise is truly reflected in preamble of the NEP document, "The future of nation is decided in the classrooms of the schools and colleges today".

Details of implementation:

NEP curriculum framework enables us to accelerate change, redesign systems with equity in mind, respond to feedback, encourage collaboration, catch and pollinate ideas and create a culture of research and development. It will allow us to offer the required academic flexibility which will focus on improving competency level of students with diverse strengths.

The curriculum planned by VIT has vertical **Program Courses** consisting of core courses (PCC) of branch of engineering positioned and sequenced to achieve sequential and integral learning of the entire breadth of the specific branch. This vertical also includes Professional elective courses (PEC) which 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 special feature of this curricula ensuring employability. The vertical **Multidisciplinary Courses** consists of Open Elective (OE) courses and multidisciplinary minor (MD M) courses. Special vocational and skill development courses are included as a part of **Skill courses** vertical that make student capable to work in industrial environment.

The student is expected to demonstrate their ability through courses in **Experiential Learning Courses** vertical like internships/On Job Training, Community Engagement Project, Real Industry Project/ research problem. Our curriculum also introduces Social Service Internship and Internship with institutes abroad along with courses like Design Thinking. This will lead to the creation of products and/ or patents through this program.

For holistic development of students, apart from technical courses, Ability Enhancement Courses, Entrepreneurship/Economics/Management Courses, Indian Knowledge System and Value Education courses from vertical **Humanities and Social Science and Management** develop the required soft-skills and attitude amongst learners.

In **Liberal Learning** vertical courses like Various Dance Forms, Global citizenship Education, Facets of Astronomy etc. aim to create balance in brain hemispheres and hence improve learners' clarity in thoughts and responses.

In addition to core courses, professional and open electives; our framework offers honor degree in each programme of engineering. It includes specialized courses along with field/ domain study that make students capable of working on industry relevant problems.

Chairman, Board of Studies  
Department of Electronics and Computer Science  
Vidyalankar Institute of Technology

Chairman, Academic Council  
Vidyalankar Institute of Technology

Course Structure and Assessment Guidelines  
for  
Bachelor of Technology  
in  
Electronics and Computer Science

### VERTICAL BASED CREDIT ALLOTMENT

Sr. No.	Verticals	Baskets	Credits
I	BSC/ESC	Basic Science	15
		Engineering Science	12
II	Program Courses	Programme Core Courses (PCC)	45
		Programme Elective Courses (PEC)	18
III	Multidisciplinary Courses	Multidisciplinary Minor (MD M)	14
		Open Electives (OE)	08
IV	Skill Courses	Vocational and Skill Enhancement Courses (VSEC)	09
V	Humanities Social Science and management (HSSM)	Ability Enhancement Courses	05
		Entrepreneurship/Economics/Management Courses	03
		Indian Knowledge System (IKS)	02
		Value education Courses (VEC)	03
VI	Experiential Learning Courses	Research Methodology	03
		Community Engagement Project (CEP)/Field Project (FP)	02
		Project	05
		Internship/OJT	13
VII	Liberal Learning Courses	Co-curricular Courses (CC)	04
<b>Total</b>			<b>161</b>

Learner is expected to complete requirement of 160 credits (with minimum credits under each category as mentioned above) for B.Tech. degree in Electronics and Computer Science with Multidisciplinary Minor

#### Structure of Honours Degree

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

#### Definition of Credit

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

Semester wise credit distribution structure for B.Tech. in Electronics and Computer Science with Multidisciplinary Minor

Semester		I	II	III	IV	V	VI	VII	VIII	Total Credits
Sub-Category	Vertical									
Basic Science Course	BSC/ ESC	6	6	3						15
Engineering Science		6	3		3					12
Programme Core Course (PCC)	Program Courses (PC)			9	12	12	12			45
Programme Elective Course (PEC)						3	6	9		18
Multidisciplinary Minor (MDM)	Multidisciplinary Courses (MDC)				3	3		6	2	14
Open Elective (OE)									8	8
Vocational and Skill Enhancement Courses (VSEC)	Skill Courses (SC)	3	3	3						9
Ability Enhancement Courses (AEC)	Humanities Social Science and Management (HSSM)	3		2						5
Entrepreneurship/ Economics/ Management Courses (EEMC)				3						3
Indian Knowledge System (IKS)						2				2
Value Education Courses (VEC)				3						3
Research Methodology (RM)	Experiential Learning Courses (ELC)								3	3
Comm. Engg. Project (CEP)/ Field Project (FP)				2						2
Project								5		5
Internship/ OJT							2	3		8
Co-curricular Courses (CC)	Liberal Learning Courses (LLC)	2	2							4
<b>Total Credits</b>		<b>20</b>	<b>20</b>	<b>19</b>	<b>20</b>	<b>20</b>	<b>21</b>	<b>20</b>	<b>21</b>	<b>161</b>

**I. Basic Science Courses (BSC)**

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	BS15T*	Engineering Physics	2	-	-	2	1
	BS15P*	Engineering Physics Lab	-	2	-	1	1
2	BS02*	Engineering Mathematics-I	3	-	-	3	1
3	BS16T*	Engineering Chemistry	2	-	-	2	2
	BS16P*	Engineering Chemistry Lab	-	2	-	1	2
4	BS04*	Engineering Mathematics-II	3	-	-	3	2
5	BS06	Applied Mathematics-III	3	-	-	3	3

\* Courses exempted for Direct Second Year (DSY) students who will secure admission through lateral entry from the A.Y. 2024-25 onwards.

## II. Engineering Science Courses (ESC)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ES01T*	Engineering Graphics	2	-	-	2	1
	ES01P*	Engineering Graphics Lab	-	2	-	1	1
2	ES02T*	Engineering Mechanics	2	-	-	2	1
	ES02P*	Engineering Mechanics Lab	-	2	-	1	1
3	ES03T*	Digital Logic Circuit	2	-	-	2	1
	ES03P*	Digital Logic Circuit Lab	-	2	-	1	1
4	EC04T	Computer Organization and Architecture	2	-	-	2	4
	EC04P	Computer Organization and Architecture Lab	-	2	-	1	4

\* Courses exempted for Direct Second Year (DSY) students who will secure admission through lateral entry from the A.Y. 2024-25 onwards.

## III. Programme Core Courses (PCC)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	EC01T	Electronic Devices and Circuits	2	-	-	2	3
	EC01P	Electronic Devices and Circuits Lab	-	2	-	1	3
2	EC02T	Electrical Circuit Analysis	2	-	-	2	3
	EC02P	Electrical Circuit Analysis Lab	-	2	-	1	3
3	EC03T	Data Structures	2	-	-	2	3
	EC03P	Data Structures Lab	-	2	-	1	3
4	EC05T	Control Systems Engineering	2	-	-	2	4
	EC05P	Control Systems Engineering Lab	-	2	-	1	4

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
5	EC06T	Signals and Systems	2	-	-	2	4
	EC06P	Signals and Systems Lab	-	2	-	1	4
6	EC07T	Web Technology	2	-	-	2	4
	EC07P	Web Technology Lab	-	2	-	1	4
7	EC08T	Database Management System	2	-	-	2	4
	EC08P	Database Management System Lab	-	2	-	1	4
8	EC10T	Basic VLSI Design	2	-	-	2	5
	EC10P	Basic VLSI Design Lab	-	2	-	1	5
9	EC11T	Microcontroller and Applications	2	-	-	2	5
	EC11P	Microcontroller and Applications Lab	-	2	-	1	5
10	EC12T	Operating System	2	-	-	2	5
	EC12P	Operating System Lab	-	2	-	1	5
11	EC13T	Analysis of Algorithms	2	-	-	2	5
	EC13P	Analysis of Algorithms Lab	-	2	-	1	5
12	EC14T	Digital Image Processing	2	-	-	2	6
	EC14P	Digital Image Processing Lab	-	2	-	1	6
13	EC15T	Theory of Computer Science	2	-	1	3	6
14	EC16T	Computer Networks	2	-	-	2	6
	EC16P	Computer Networks Lab	-	2	-	1	6
15	EC17T	Analog & Digital Communications	2	-	-	2	6
	EC17P	Analog & Digital Communications Lab	-	2	-	1	6

#### IV. Programme Elective Courses (PEC)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	EC21T	Artificial Intelligence	2	-	-	2	5
	EC21P	Artificial Intelligence lab	-	2	-	1	5
2	EC22T	Advanced Database Management	2	-	-	2	5

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
	EC22P	Advanced Database Management Lab	-	2	-	1	5
3	EC23T	Modern Sensors for IOT	2	-	-	2	5
	EC23P	Modern Sensors for IOT Lab	-	2	-	1	5
4	EC24T	Digital System Design	2	-	-	2	5
	EC24P	Digital System Design Lab	-	2	-	1	5
5	EC25T	Soft Computing	2	-	-	2	6
	EC25P	Soft Computing Lab	-	2	-	1	6
6	EC26T	Data Warehousing and Mining	2	-	-	2	6
	EC26P	Data Warehousing and Mining Lab	-	2	-	1	6
7	EC27T	Principles of IOT	2	-	-	2	6
	EC27P	Principles of IOT Lab	-	2	-	1	6
8	EC28T	Advanced VLSI Design and Technology	2	-	-	2	6
	EC28P	Advanced VLSI Design and Technology Lab	-	2	-	1	6
9	EC29T	Machine Learning	2	-	-	2	6
	EC29P	Machine Learning Lab	-	2	-	1	6
10	EC30T	Probabilistic Graphical Models	2	-	-	2	6
	EC30P	Probabilistic Graphical Models Lab	-	2	-	1	6
11	EC31T	Embedded System Design with tiny OS	2	-	-	2	6
	EC31P	Embedded System Design with tiny OS Lab	-	2	-	1	6
12	EC32T	Analog IC Design	2	-	-	2	6
	EC32P	Analog IC Design Lab	-	2	-	1	6
13	EC33T	Data Analytics & Visualization	2	-	-	2	7
	EC33P	Data Analytics & Visualization Lab	-	2	-	1	7
14	EC34T	Big Data Analytics	2	-	-	2	7
	EC34P	Big Data Analytics Lab	-	2	-	1	7
15	EC35T	IoT and Edge Computing	2	-	-	2	7
	EC35P	IoT and Edge Computing Lab	-	2	-	1	7



Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
16	EC36T	ASIC and Verification	2	-	-	2	7
	EC36P	ASIC and Verification Lab	-	2	-	1	7
17	EC37T	Deep Learning	2	-	-	2	7
	EC37P	Deep Learning Lab	-	2	-	1	7
18	EC38T	Recommendation Systems	2	-	-	2	7
	EC38P	Recommendation Systems Lab	-	2	-	1	7
19	EC39T	IoT Security and Trust	2	-	-	2	7
	EC39P	IoT Security and Trust Lab	-	2	-	1	7
20	EC40T	System on Chip	2	-	-	2	7
	EC40P	System on Chip Lab	-	2	-	1	7
21	EC41T	Natural language processing	2	-	-	2	7
	EC41P	Natural language processing Lab	-	2	-	1	7
22	EC42T	Text, Web & Social Media Analytics	2	-	-	2	7
	EC42P	Text, Web & Social Media Analytics Lab	-	2	-	1	7
23	EC43T	Industrial IOT	2	-	-	2	7
	EC43P	Industrial IOT Lab	-	2	-	1	7
24	EC44T	Mixed Signal VLSI	2	-	-	2	7
	EC44P	Mixed Signal VLSI Lab	-	2	-	1	7

#### V. Multidisciplinary Minor Courses (MD M)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	BS08	Applied Mathematics-IV	3	-	-	3	4
2	OE02	Project Management	2	-	-	3	Any Semester
3	OE03	Product Lifecycle Management	2	-	-	3	
4	OE04	Sustainability Management	2	-	-	3	
5	GESB07	Psychology	2	-	-	2	
6	GENS02	Modern Farming	2	-	-	2	

**VI. Open Elective Courses (OE)**

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	OE01	Cyber Law	3	-	-	3	7/8
2	OE05	Operation Research	3	-	-	3	7/8
3	OE06	IPR and Patenting	3	-	-	2	7/8
4	OE08	Renewable Energy Management	3	-	-	3	7/8
5	OE09	Energy Audit and Management	3	-	-	3	7/8
6	OE10	E-Farming	3	-	-	2	7/8
7	OE11	Bioinformatics	3	-	-	3	7/8
8	OE12	Nanotechnology	3	-	-	3	7/8

**VII. Vocational and Skill Enhancement Courses (VSEC)**

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ES04T*	Structured Programming	2	-	-	2	1
	ES04P*	Structured Programming Lab	-	2	-	1	
2	ES05T*	Object Oriented Programming	2	-	-	2	1
	ES05P*	Object Oriented Programming Lab	-	2	-	1	
3	EC09P	Python Programming	2	-	-	2	3
	EC09T	Python Programming Lab	-	2	-	1	

**VIII. Ability Enhancement Courses (AEC)**

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GE01\$	Credit Transfer Course	60	-	-	4	Any Semester
2	HS01T*	Effective Communication	2	-	-	2	
	HS01P*	Effective Communication Lab	-	2	-	1	
3	HS03	Technical and Business Writing Lab	1	2	-	2	
4	GEA01	Voice Culture for Professional Speaking	2	-	-	2	
5	GESB04	Corporate and Social Etiquettes	2	-	-	2	

**IX. Entrepreneurship/Economics/Management Courses (EEMC)**

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GECI01	Design Thinking	2	-	1	3	Any Semester
2	GECI02	Innovation and Entrepreneurship	1	-	-	1	
3	GEF01	Basics of Finance & Legal aspects for Business	2	-	-	2	
4	GEF02	Financial Management for beginners	2	-	-	2	
5	HS06	Principles of Economics and Management	2	-	1	3	

**X. Indian Knowledge System (IKS)**

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GEA03	Exploring Indian Art	2	-	-	2	4
2	GESB03	Indian Traditional Knowledge System	2	-	-	2	4
3	GEPS01	Indian Constitution	2	-	-	2	4

**XI. Value Education Courses (VEC)**

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	HS02T	Professional Skills	2	-	-	2	Any Semester
	HS02P	Professional Skills Lab	-	2	-	1	
2	GESB02	Universal Human Values	2	-	-	2	
3	GESB06	Responsibility towards sustainable environment	2	-	-	2	
4	GEPS02	Four Pillars of Democratic Nation	2	-	-	2	
5	GEWI01	Indian Railways - Wonders of Infrastructure	2	-	-	2	

## XII. Research Methodology (RM)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	OE07	Research Methodology	3	-	-	3	7/8

## XIII. Community Engagement Project (CEP)/Field Project (FP)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GESB01#	Social Service Internship/ Project	-	60 hrs	-	2	3

## XIV. Project

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
4	EC48	Project-2 (Final)	1	6	-	4	7/8
5	EC49	Publication	1	-	-	1	7/8

## XV. Internship/OJT

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	EC45	Mini Project-1	-	4	-	2	5
2	EC46	Industry Internship & Project-1 (Synopsis)	-	Semester Internship	-	13	6/7/8

## XVI. Co-curricular Courses (CC)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GEA02	Various Dance Forms	2	-	-	2	1/2
2	GESB05	Global Citizenship Education	2	-	-	2	1/2
3	GEPEW01	Wellness – Body, Mind & Spirit	2	-	-	2	1/2
4	GEPEW02	IQ vs EQ	2	-	-	2	1/2
5	GEPEW03	Nutrition and Physical Wellness	2	-	-	2	1/2
6	GENS01	Facets of Astronomy	2	-	-	2	1/2

**First Year B. Tech. Electronics and Computer Science  
Course Structure and Assessment Guidelines**

**Preferred Semester: I**

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Verticals	Code	Name			ISA	MSE	ESE	
BSC	BS02	Engineering Mathematics-I	Theory	3	20	30	50	100
	BS15T	Engineering Physics	Theory	2	15	20	40	075
	BS15P	Engineering Physics Lab	Practical	1	25	-	25	050
ESC	ES03T	Digital Logic Circuit	Theory	2	15	20	40	075
	ES03P	Digital Logic Circuit Lab	Practical	1	25	-	25	050
	ES02T	Engineering Mechanics	Theory	2	15	20	40	075
	ES02P	Engineering Mechanics Lab	Practical	1	25	-	25	050
SC-VSEC	ES04T	Structured Programming	Theory	2	15	20	40	075
	ES04P	Structured Programming Lab	Practical	1	25	-	25	050
LLC-CC	GEXXX	Any one CC course offered in the semester	As per Course	2	As per Course			075
HSSM	HSXXT	Any HSSM_AEC Course	Theory	2	15	20	40	075
	HSXXP		Practical	1	25	-	25	050
<b>Total Credits</b>				<b>20</b>				

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

The assessment guidelines for the courses of different credits are mentioned above. 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 and Computer Science  
Course Structure and Assessment Guidelines**

**Preferred Semester: II**

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Vertical	Code	Name			ISA	MSE	ESE	
BSC	BS04	Engineering Mathematics-II	Theory+ Tutorial	3	20	30	50	100
	BS16T	Engineering Chemistry	Theory	2	15	20	40	075
	BS16P	Engineering Chemistry Lab	Practical	1	25	-	25	050
ESC	ES01T	Engineering Graphics	Theory	2	15	20	40	075
	ES01T	Engineering Graphics Lab	Practical	1	25	-	25	050
SC-VSEC	ES05T	Object Oriented Programming	Theory	2	15	20	40	075
	ES05P	Object Oriented Programming Lab	Practical	1	25	-	25	050
HSSM	GEXXX	Any one HSSM_EEMC course offered in the semester	As per course	3	As per course			100
LLC-CC	GEXXX	Any one CC offered in the semester	As per course	2	As per course			075
HSSM	HSXXT	Any HSSM_VEC Course	Theory	2	15	20	40	075
	HSXXP		Practical	1	25	-	25	050
<b>Total Credits</b>				<b>20</b>				

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

The assessment guidelines for the courses of different credits are mentioned above. 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 Computer Science**  
**Course Structure and Assessment Guidelines**

**Preferred Semester: III**

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40 % of total marks)
NEP-Vertical	Code	Name			ISA	MSE	ESE	
HSSM_AEC	HS03	Technical and Business Writing	Theory + Practical	2	75	-	-	075
BSC	BS06	Applied Mathematics-III	Theory	3	20	30	50	100
PC-PCC	EC01T	Electronic Devices and Circuits	Theory	2	15	20	40	075
	EC01P	Electronic Devices and Circuits Lab	Practical	1	25	-	25	050
PC-PCC	EC02T	Electrical Circuit Analysis	Theory	2	15	20	40	075
	EC02P	Electrical Circuit Analysis Lab	Practical	1	25	-	25	050
PC-PCC	EC03T	Data Structures	Theory	2	15	20	40	075
	EC03P	Data Structures Lab	Practical	1	25	-	25	050
SC-VSEC	EC09T	Python Programming	Theory	2	15	20	40	075
	EC09P	Python Programming Lab	Practical	1	25	-	25	050
CEP/FP	GEXX*	Social Service Internship	As per course	2	As per course			075
<b>Total Credits</b>				<b>19</b>				

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

The assessment guidelines for the courses of different credits are mentioned above. 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 Computer Science  
Course Structure and Assessment Guidelines**

**Preferred Semester: IV**

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Vertical	Code	Name			ISA	MSE	ESE	
HSSM_IKS	XXXX	Any one course from HSSM_IKS	Theory	2	15	20	40	075
MC-MD M	BS08	Applied Mathematics-IV	Theory	3	20	30	50	100
ESC	EC04T	Computer Organization & Architecture	Theory	2	15	20	40	075
	EC04P	Computer Organization & Architecture Lab	Practical	1	25	-	25	050
PC-PCC	EC05T	Control Systems Engineering	Theory	2	15	20	40	075
	EC05P	Control Systems Engineering Lab	Practical	1	25	-	25	050
PC-PCC	EC06T	Signals and Systems	Theory	2	15	20	40	075
	EC06P	Signals and Systems Lab	Practical	1	25	-	25	050
PC-PCC	EC07T	Web Technology	Theory	2	15	20	40	075
	EC07P	Web Technology Lab	Practical	1	25	-	25	050
PC-PCC	EC08T	Database Management System	Theory	2	15	20	40	075
	EC08P	Database Management System Lab	Practical	1	25	-	25	050
<b>Total Credits</b>				<b>20</b>				

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

The assessment guidelines for the courses of different credits are mentioned above. 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.



**Third Year B. Tech. Electronics and Computer Science**  
**Course Structure and Assessment Guidelines**

**Preferred Semester: V**

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Vertical	Code	Name			ISA	MSE	ESE	
MC-MDM	MDMXX	MD M-2	As per course	3	20	30	50	100
PC-PCC	EC10T	Basic VLSI Design	Theory	2	15	20	40	075
	EC10P	Basic VLSI Design Lab	Practical	1	25	-	25	050
PC-PCC	EC11T	Microcontroller and Applications	Theory	2	15	20	40	075
	EC11P	Microcontroller and Applications Lab	Practical	1	25	-	25	050
PC-PCC	EC12T	Operating System	Theory	2	15	20	40	075
	EC12P	Operating System Lab	Practical	1	25	-	25	050
PC-PCC	EC13T	Analysis of Algorithms	Theory	2	15	20	40	075
	EC13P	Analysis of Algorithms Lab	Practical	1	25	-	25	050
PC-PEC	ECXXT	Professional Elective-1	Theory	2	15	20	40	075
	ECXXP	Professional Elective-1 Lab	Practical	1	25	-	25	050
INT/OJT	EC45	Mini Project	Practical	2	25	-	50	075
<b>Total Credits</b>				<b>20</b>				

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

The assessment guidelines for the courses of different credits are mentioned above. 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 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

**Professional Elective -1 Courses (ECXX)**

Course Code	Course Name	Specialization Track Name#
EC21T	Artificial Intelligence	Artificial Intelligence & Machine Learning
EC21P	Artificial Intelligence lab	
EC22T	Advanced Database Management	Data Analytics
EC22P	Advanced Database Management Lab	
EC23T	Modern Sensors for IOT	Internet of Things
EC23P	Modern Sensors for IOT Lab	
EC24T	Digital System Design	VLSI Design
EC24P	Digital System Design Lab	

#For details of Specialization Certificate, refer Appendix-A

**Guidelines for Award of Honours 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 Degree Programme Detailed guidelines regarding the Honours Degree Programmes of all the departments, Eligibility criterion and Credit requirements are given in Appendix-B. Courses relevant to Honours Degree Programmes offered by Department of Electronics and Computer Science are given in Appendix-C.

**Third Year B. Tech. Electronics and Computer Science**  
**Course Structure and Assessment Guidelines**

**Preferred Semester: VI**

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Vertical	Code	Name			ISA	MSE	ESE	
PC-PCC	EC14T	Digital Image Processing	Theory	2	15	20	40	075
	EC14P	Digital Image Processing Lab	Practical	1	25	-	25	050
PC-PCC	EC15T	Theory of Computer Science	Theory + Tutorial	3	40	20	40	100
PC-PCC	EC16T	Computer Networks	Theory	2	15	20	40	075
	EC16P	Computer Networks Lab	Practical	1	25	-	25	050
PC-PCC	EC17T	Analog & Digital Communications	Theory	2	15	20	40	075
	EC17P	Analog & Digital Communications Lab	Practical	1	25	-	25	050
PC-PEC	ECXXT	Professional Elective-2	Theory	2	15	20	40	075
	ECXXP	Professional Elective-2 Lab	Practical	1	25	-	25	050
PC-PEC	ECXXT	Professional Elective-3	Theory	2	15	20	40	075
	ECXXP	Professional Elective-3 Lab	Practical	1	25	-	25	050
INT/OJT	EC47	Project-1 (Internship)	As Per Course	3	As Per course			100
<b>Total Credits</b>				<b>21</b>				

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

The assessment guidelines for the courses of different credits are mentioned above. 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.

**Professional Elective - 2 Courses (ECXX)**

Course Code	Course Name	Specialization Track Name#
EC25T	Soft Computing	Artificial Intelligence & Machine Learning
EC25P	Soft Computing Lab	
EC25T	Data Warehousing and Mining	Data Analytics
EC25P	Data Warehousing and Mining Lab	
EC26T	Principles of IOT	Internet of Things
EC26P	Principles of IOT Lab	
EC27T	Advanced VLSI Design and Technology	VLSI Design
EC27P	Advanced VLSI Design and Technology Lab	

#For details of Specialization Certificate, refer Appendix-A

**Professional Elective - 3 Courses (ECXX)**

Course Code	Course Name	Specialization Track Name#
EC28T	Machine Learning	Artificial Intelligence & Machine Learning
EC28P	Machine Learning Lab	
EC29T	Probabilistic Graphical Models	Data Analytics
EC29P	Probabilistic Graphical Models Lab	
EC30T	Embedded System Design with tiny OS	Internet of Things
EC30P	Embedded System Design with tiny OS Lab	
EC31T	Analog IC Design	VLSI Design
EC31P	Analog IC Design Lab	

#For details of Specialization Certificate, refer Appendix-A

**Final Year B. Tech. Electronics and Computer Science  
Course Structure and Assessment Guidelines**

**Preferred Semester: VII**

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Vertical	Code	Name			ISA	MSE	ESE	
PC-PEC	ECXXT	Professional Elective-4	Theory	2	15	20	40	075
	ECXXP	Professional Elective-4 Lab	Practical	1	25	-	25	050
PC-PEC	ECXXT	Professional Elective-5	Theory	2	15	20	40	075
	ECXXP	Professional Elective-5 Lab	Practical	1	25	-	25	050
PC-PEC	ECXXT	Professional Elective-6	Theory	2	15	20	40	075
	ECXXP	Professional Elective-6 Lab	Practical	1	25	-	25	050
MC-MDM	XXXX	MD M-3	Theory	3	20	30	50	100
	XXXX	MD M-4	Theory	3	20	30	50	100
PR	EC48	Project 2 – (Final)	Theory + Practical	4	75	-	50	125
	EC49	Publication	Theory	1	25	-	25	050
<b>Total Credits</b>				<b>20</b>				

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

The assessment guidelines for the courses of different credits are mentioned above. 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.

**Professional Elective - 4 Courses (ECXX)**

Course Code	Course Name	Specialization Track Name#
EC32T	Data Analytics & Visualization	Artificial Intelligence & Machine Learning
EC32P	Data Analytics & Visualization Lab	
EC33T	Big Data Analytics	Data Analytics
EC33P	Big Data Analytics Lab	
EC34T	IoT and Edge Computing	Internet of Things
EC34P	IoT and Edge Computing	
EC35T	ASIC and Verification	VLSI Design
EC35P	ASIC and Verification Lab	

#For details of Specialization Certificate, refer Appendix-A

**Professional Elective - 5 Courses (ECXX)**

Course Code	Course Name	Specialization Track Name#
EC36T	Deep Learning	Artificial Intelligence & Machine Learning
EC36P	Deep Learning Lab	
EC37T	Recommendation Systems	Data Analytics
EC37P	Recommendation Systems Lab	
EC38T	IoT Security and Trust	Internet of Things
EC38P	IoT Security and Trust Lab	
EC39T	System on Chip	VLSI Design
EC39P	System on Chip Lab	

#For details of Specialization Certificate, refer Appendix-A

**Professional Elective - 6 Courses (ECXX)**

Course Code	Course Name	Specialization Track Name#
EC40T	Natural language processing	Artificial Intelligence & Machine Learning
EC40P	Natural language processing Lab	
EC41T	Text, Web & Social Media Analytics	Data Analytics
EC41P	Text, Web & Social Media Analytics Lab	
EC42T	Industrial IOT	Internet of Things
EC42P	Industrial IOT Lab	
EC43T	Mixed Signal VLSI	VLSI Design
EC43P	Mixed Signal VLSI Lab	

#For details of Specialization Certificate, refer Appendix-A

**Final Year B. Tech. Electronics and Computer Science**  
**Course Structure and Assessment Guidelines**

**Preferred Semester: VIII**

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Vertical	Code	Name			ISA	MSE	ESE	
MC-OE	OEXXX	Open Elective-1	Theory	3	20	30	50	100
	OEXXX	Open Elective-2	Theory	3	20	30	50	100
	OEXXX	Open Elective-3	Theory	2	20	30	50	100
MC-MDM	XXXX	MD M-5	Theory	2	15	20	40	075
ELC-RM	GEXXX	Research Methodology	Theory	3	20	30	50	100
INT/OJT	EC46	Internship	-	8	As Per Course			225
<b>Total Credits</b>				<b>21</b>				

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

\*Selection is based on subset of OE courses offered by the Institute for the semester.

The assessment guidelines for the courses of different credits are mentioned above. 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 component) as a part of the requirement for B.Tech. Degree.

Specialization Certificate is introduced in order to build competency of learners in the chosen domain. Department of Computer Engineering offers the following specialization tracks:

1. Artificial Intelligence and Machine Learning (AIML)
2. Data Analytics (DA)
3. Internet of Things (IoT)
4. VLSI Design (VLSID)

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 specialization tracks will not be eligible for a Specialization Certificate.

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

#### **AIML track: Courses to be chosen for specialization in Artificial Intelligence and Machine Learning**

Semester	Course Code	Course Name
V	EC21T	Artificial Intelligence
V	EC21P	Artificial Intelligence Lab
VI	EC25T	Soft Computing
VI	EC25P	Soft Computing Lab
VI	EC29T	Machine Learning
VI	EC29P	Machine Learning Lab
VII	EC33T	Data Analytics & Visualization
VII	EC33P	Data Analytics & Visualization Lab
VII	EC37T	Deep Learning
VII	EC37P	Deep Learning Lab
VII	EC41T	Natural language processing
VII	EC41P	Natural language processing Lab



**DA track: Courses to be chosen for specialization in Data Analytics**

Semester	Course Code	Course Name
V	EC22T	Advanced Database Management
V	EC22P	Advanced Database Management Lab
VI	EC26T	Data Warehousing and Mining
VI	EC26P	Data Warehousing and Mining Lab
VI	EC30T	Probabilistic Graphical Models
VI	EC30P	Probabilistic Graphical Models Lab
VII	EC34T	Big Data Analytics
VII	EC34P	Big Data Analytics Lab
VII	EC38T	Recommendation Systems
VII	EC38P	Recommendation Systems Lab
VII	EC41T	Text, Web & Social Media Analytics
VII	EC41P	Text, Web & Social Media Analytics Lab

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

Semester	Course Code	Course Name
V	EC23T	Modern Sensors for IOT
V	EC23P	Modern Sensors for IOT Lab
VI	EC27T	Principles of IOT
VI	EC27P	Principles of IOT Lab
VI	EC31T	Embedded System Design with tiny OS
VI	EC31P	Embedded System Design with tiny OS Lab
VII	EC35T	IoT and Edge Computing
VII	EC35P	IoT and Edge Computing Lab
VII	EC39T	IoT Security and Trust
VII	EC39P	IoT Security and Trust Lab
VII	EC42T	Industrial IOT
VII	EC42P	Industrial IOT Lab

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

Semester	Course Code	Course Name
V	EC24	Digital System Design
V	EC24	Digital System Design Lab
VI	EC28	Advanced VLSI Design and Technology
VI	EC28	Advanced VLSI Design Technology Lab
VI	EC32	Analog IC Design
VI	EC32	Analog IC Design Lab
VII	EC36	ASIC and Verification
VII	EC36	ASIC and Verification Lab
VII	EC40	System on Chip
VII	EC40	System on Chip Lab
VII	EC43	Mixed Signal VLSI

## **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 Honours programme offered by his/her own department. Alternatively, for Minor Degree, learner shall select one of the two programmes offered by INFT 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) can 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		Head of Learning	Preferred Semester	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name				ISA	MSE	ESE	
1	XXXX	Industry Interaction	Theory	Break of Sem5 and Sem6	1	25	-	-	025
2	XXXX	Honours / Minor Degree Course 1	Theory	6	2	15	20	40	075

Programme Structure (R 2023) for Bachelor of Technology (B.Tech.) – Electronics and Computer Science

	XXXX	Honours / Minor Degree Course 1 Lab	Practical	6	1	25	-	25	050
3	XXXX	Survey Report/ Paper	Theory	Break of Sem6 and Sem7	2	50	-	25	075
4	XXXX	Honours / Minor Degree Course 2	Theory	7	2	15	20	40	075
	XXXX	Honours / Minor Degree Course 2 Lab	Practical	7	1	25	-	25	050
5	XXXX	Seminar	Theory	Break of Sem7 and Sem8	2	50	-	25	075
6	XXXX	Honours / Minor Degree Course 3	Theory	8	2	15	20	40	075
	XXXX	Honours / Minor Degree Course 3 Lab	Practical	8	1	25	-	25	050
7	XXXX	Capstone Project	Practical	8	4	75	-	50	125
<b>Total</b>					<b>18</b>				

**Honours Degree Programmes Offered.**

Sr.No.	Honours Degree Programme	Department offering Honours
1	Artificial Intelligence and Machine Learning	Electronics and Computer Science
2	Data Analytics	Electronics and Computer Science
3	Advance Internet of Things	Electronics and Computer Science

**Minor Degree Programmes Offered.**

Sr.No.	Minor Degree Programme	Department offering Minor
1	UI/UX	Information Technology
2	Blockchain	Information Technology

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

- Electronics and Computer Science Department learners can refer to the list of Honours/Minor Degree Programme and their corresponding courses in the Appendix-C.

## Appendix-C

### Honours/ Minor Degree Programmes offered by Department of Electronics and Computer Science

The Department of Electronics and Computer Science offers the below listed Honours/Minor Degree Programme for learners of Electronics and Computer Science.

#### Honours Degree Programme Courses

1. AIML
2. Data Analytics
3. Advance IOT

#### Minor Degree Programme Courses

1. UI/UX
2. Blockchain

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

##### 1. AIML

Semester	Course Code	Course Name
VI	EC54T	Multimedia System
VI	EC54P	Multimedia System Lab
VII	EC58T	Game Architecture and Programming
VII	EC58P	Game Architecture and Programming Lab
VIII	EC62T	Augmented and Virtual Reality
VIII	EC62P	Augmented and Virtual Reality Lab

##### 2. Data Analytics

Semester	Course Code	Course Name
VI	EC55T	Data Visualization Using R-Programming
VI	EC55P	Data Visualization Using R-Programming Lab
VII	EC59T	Deep Learning
VII	EC59P	Deep Learning Lab
VIII	EC63T	Adaptive Business Intelligence Systems
VIII	EC63P	Adaptive Business Intelligence Systems Lab

##### 3. IOT

Semester	Course Code	Course Name
VI	EC56T	Embedded Linux System
VI	EC56P	Embedded Linux System Lab
VII	EC60T	IOT & Data Analytics
VII	EC60P	IOT & Data Analytics Lab
VIII	EC64T	IOT Applications & Web Development
VIII	EC64P	IOT Applications & Web Development Lab

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

**1. UI/UX**

Semester	Course Code	Course Name
VI	XXXX	Foundation of UI/UX
VII	XXXX	Design & Evaluation
VIII	XXXX	Applied UI/UX with Capstone Project

**2. Blockchain**

Semester	Course Code	Course Name
VI	XXXX	Blockchain Technology
VII	XXXX	Smart Contract & Crypto Currencies
VIII	XXXX	Decentralize & Blockchain Technologies