



Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

Bachelor of Technology

in

Information Technology

Programme Structure

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

Course Structure and Assessment Guidelines
for
Bachelor of Technology
in
Information Technology

Preamble

The National Education Policy (NEP) framework aims to break the mould from teacher centric to student centric educational practices. It empowers the students with flexibility in terms of choosing courses across different faculties and mode 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 course 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 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. aims to create balance in brain hemispheres and hence improve learners' clarity in thoughts and responses.

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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 student capable of working on industry relevant problems.

Chairman, Board of Studies
Department of Information Technology
Vidyalankar Institute of Technology

Chairman, Academic Council
Vidyalankar Institute of Technology

VERTICAL BASED CREDIT ALLOTMENT

Sr. No.	Verticals	Baskets	Credits
I	BSC/ ESC	Basic Science (BS)	15
II		Engineering Science (ES)	12
III	Program Courses	Programme Core Course (PCC)	45
IV		Programme Elective Course (PEC)	18
V	Multidisciplinary Courses	Multidisciplinary Minor (MDM)	14
VI		Open Elective (OE)	08
VII	Skill Courses	Vocational and Skill Enhancement Course (VSEC)	08
VIII	Humanities Social Science and Management (HSSM)	Ability Enhancement Course (AEC)	15
IX		Entrepreneurship/ Economics/ Management Course (EEMC)	
X		Indian Knowledge System (IKS)	
XI		Value Education Course (VEC)	
XII	Experiential Learning Courses	Research Methodology (RM)	03
XIII		Comm. Engg. Project (CEP)/ Field Project (FP)	02
XIV		Project	06
XV		Internship/ OJT	12
XVI	Liberal Learning Courses	Co-Curricular Courses (CC)	04
Total			162

Learner is expected to complete requirement of 162 credits (with minimum credits under each vertical and/or bucket as mentioned above) for B.Tech. degree in Information Technology with Multidisciplinary Minor.

Additionally, learners can choose to avail i) B.Tech. in Information Technology – Honors and Multidisciplinary Minor or ii) B.Tech. in Information Technology - Honours with Research and Multidisciplinary Minor or iii) B.Tech. in Information Technology with Double Minors (Multidisciplinary and Specialization Minor) Degree by completing requirements of 18 credits, which will be over and above the 163 credits required for B.Tech. with Multidisciplinary Minor degree.

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

Courses Under Various Baskets

Programme Structure for NEP-2020 (R-2023) for Bachelor of Technology (B.Tech.)
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i. Basic Science Courses (BSC)

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	BS14T	Physics	2	-	-	2	1
2	BS14P	Physics Lab	-	2	-	1	1
3	BS01	Engineering Mathematics-I	3	-	-	3	1
4	BS03	Engineering Mathematics-II	3	-	-	3	2
5	BS41	Engineering Mathematics-III	3	-	-	3	3
6	BS42	Engineering Mathematics-IV	3	-	-	3	3
Total Credits						15	

ii. Engineering Science Courses (ESC)

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ES06T	Fundamentals of Computer Hardware and Networking	2	-	-	2	1
2	ES06P	Fundamentals of Computer Hardware and Networking Lab	-	2	-	1	1
3	ES01T	Engineering Graphics	2	-	-	2	2
4	ES01P	Engineering Graphics Lab	-	2	-	1	2
5	ES07T	Fundamentals of Logic Circuits	2	-	-	2	1
6	ES07P	Fundamentals of Logic Circuits Lab	-	2	-	1	1
7	ES10	Computer Organization and Architecture	3	-	-	3	2
Total Credits						12	

iii. Programme Core Courses (PCC)

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	IT01T	Data Structure & Analysis	2	-	-	2	3
2	IT01P	Data Structure & Analysis Lab	-	2	-	1	3
3	IT02T	Advanced Java	2	-	-	2	3
4	IT02P	Advanced Java Lab	-	2	-	1	3
5	IT04T	Microprocessor	2	-	-	2	3
5	IT04P	Microprocessor Lab	-	2	-	1	3
9	IT05T	Operating Systems	2	-	-	2	4
10	IT05P	Operating Systems Lab	-	2	-	1	4
11	IT06T	Computer Networks	2	-	-	2	4

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Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
12	IT06P	Computer Networks Lab	-	2	-	1	4
13	IT07T	Database Management Systems	2	-	-	2	4
14	IT07P	Database Management Systems Lab	-	2	-	1	4
16	IT09	Automata Theory	2	-	1	3	4
7	IT03T	Computer Graphics	2	-	-	2	5
8	IT03P	Computer Graphics Lab	-	2	-	1	5
17	IT10T	Data warehousing & Mining	2	-	-	2	5
18	IT10P	Data warehousing & Mining Lab	-	2	-	1	5
19	IT11T	Artificial Intelligence & Machine Learning	2	-	-	2	5
20	IT11P	Artificial Intelligence & Machine Learning Lab	-	2	-	1	5
21	IT12T	Software Engineering with WDL	2	-	-	2	5
22	IT12P	Software Engineering with WDL Lab	-	2	-	1	5
23	IT13T	Cloud Computing	2	-	-	2	6
24	IT13P	Cloud Computing Lab	-	2	-	1	6
27	IT15T	Mobile Communication & Computing	2	-	-	2	6
28	IT15P	Mobile Communication & Computing Lab	-	2	-	1	6
25	IT14T	Software Testing & Quality Assurance	2	-	-	2	7
26	IT14P	Software Testing & Quality Assurance Lab	-	2	-	1	7
29	IT16T	DevOps	2	-	-	2	8
30	IT16P	DevOps Lab	-	2	-	1	8
Total Credits						45	

iv. Programme Elective Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	IT21T	Artificial Intelligence	2	-	-	2	5
2	IT21P	Artificial Intelligence Lab	-	2	-	1	5
3	IT22T	Advanced Database System	2	-	-	2	5
4	IT22P	Advanced Database System Lab	-	2	-	1	5
5	IT23T	Modern Sensors for IoT	2	-	-	2	5

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Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
6	IT23P	Modern Sensors for IoT Lab	-	2	-	1	5
7	IT24T	Computer & Network Security	2	-	-	2	5
8	IT24P	Computer & Network Security Lab	-	2	-	1	5
9	IT25T	Soft Computing	2	-	-	2	6
10	IT25P	Soft Computing Lab	-	2	-	1	6
11	IT26T	Data & Feature Engineering	2	-	-	2	6
12	IT26P	Data & Feature Engineering Lab	-	2	-	1	6
13	IT27T	Principles of IoT	2	-	-	2	6
14	IT27P	Principles of IoT Lab	-	2	-	1	6
15	IT28T	System Security & Ethical Hacking	2	-	-	2	6
16	IT28P	System Security & Ethical Hacking Lab	-	2	-	1	6
17	IT29T	Probabilistic Graphical Model	2	-	-	2	7
18	IT29P	Probabilistic Graphical Model Lab	-	2	-	1	7
19	IT31T	Embedded System Design with Tiny OS	2	-	-	2	7
20	IT31P	Embedded System Design with Tiny OS Lab	-	2	-	1	7
21	IT32T	Digital Forensic	2	-	-	2	7
22	IT32P	Digital Forensic Lab	-	2	-	1	7
23	IT33T	Data Analytics & Visualization	2	-	-	2	7
24	IT33P	Data Analytics & Visualization Lab	-	2	-	1	7
25	IT34T	Big Data Analytics	2	-	-	2	7
26	IT34P	Big Data Analytics Lab	-	2	-	1	7
27	IT35T	IoT Network & Protocols & Edge Computing	2	-	-	2	7
28	IT35P	IoT Network & Protocols & Edge Computing Lab	-	2	-	1	7
29	IT36T	Mobile and Wireless Security	2	-	-	2	7
30	IT36P	Mobile and Wireless Security Lab	-	2	-	1	7
31	IT37T	Deep Learning	2	-	-	2	7
32	IT37P	Deep Learning Lab	-	2	-	1	7

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Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
33	IT38T	Recommendation System	2	-	-	2	7
34	IT38P	Recommendation System Lab	-	2	-	1	7
35	IT39T	IoT Security & Trust	2	-	-	2	7
36	IT39P	IoT Security & Trust Lab	-	2	-	1	7
37	IT40T	Malware Analysis	2	-	-	2	7
38	IT40P	Malware Analysis Lab	-	2	-	1	7
39	IT41T	Natural Language Processing	2	-	-	2	8
40	IT41P	Natural Language Processing Lab	-	2	-	1	8
41	IT42T	Text, Web & Social Media Analytics	2	-	-	2	8
42	IT42P	Text, Web & Social Media Analytics Lab	-	2	-	1	8
43	IT43T	Industrial IoT	2	-	-	2	8
44	IT43P	Industrial IoT Lab	-	2	-	1	8
45	IT44T	Web Application Security	2	-	-	2	8
46	IT44P	Web Application Security Lab	-	2	-	1	8
		Total				72	

v. Multidisciplinary Minor Courses

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	BS17	Biology	2	-	-	2	3 or 4
2	BS19	Chemistry	2	-	-	2	3 or 4
3	OE13	Principle of Communication Engineering	2	-	-	2	3 or 4
4	GENS02	Modern Farming	2	-	-	2	Any
Total Credits						11	

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vi. Open Elective Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits
			Theory	Practical	Tutorial	
1	OE21	Cyber Law	3	-	-	3
2	OE22	Project Management	3	-	-	3
3	OE23	Product Lifecycle Management	3	-	-	3
4	OE24	Sustainability Management	3	-	-	3
5	OE25	Operation Research	3	-	-	3
6	OE26	IPR and Patenting	3	-	-	3
7	OE27	Research Methodology	3	-	-	3
8	OE28	Renewable Energy Management	3	-	-	3
9	OE29	Energy Audit and Management	3	-	-	3
10	OE30	Bioinformatics	3	-	-	3
11	OE31	Nanotechnology	3	-	-	3
12	OE32	Engineering Mathematics – IV	3	-	-	3
13	OE33	Phycology	3	-	-	3
		Total				39

vii. Vocational and Skill Enhancement Courses

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	ES04T	Structured Programming	2	-	-	2	1
2	ES04P	Structured Programming Lab	-	2	-	1	1
3	ES05T	Object Oriented Programming	2	-	-	2	2
4	ES05P	Object Oriented Programming Lab	-	2	-	1	2
5	ES10	Python Programming	-	4	-	2	4
Total Credits						8	

viii. Ability Enhancement Courses

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	HS01T	Effective Communication	2	-	-	2	Any
2	HS01P	Effective Communication Lab	-	2	-	1	Any
3	HS03	Technical and Business Writing	1	2	-	2	Any
4	HS04	Presentation Skills	-	2	-	1	Any
5	GEA01	Voice Culture for Professional Speaking	2	-	-	2	Any
6	GESB04	Corporate and Social Etiquettes	2	-	-	2	Any
7	GE01\$	Internship with other Institutes (Credit Transfer)	Minimum 120 hours			4	SE Break
Total Credits						14	

\$ 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).

ix. Entrepreneurship/ Economics/ Management Courses

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	HS06	Principles of Economics and Management	2	-	1	3	Any
2	GECI01	Design Thinking	3	-	-	3	2
3	GECI02	Innovation and Entrepreneurship	1	-	-	1	Any
4	GEF01	Basics of Finance & Legal aspects for Business	2	-	-	2	Any
5	GEF02	Financial Management for beginners	2	-	-	2	Any
Total Credits						11	

x. Indian Knowledge System Courses

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GEA03	Exploring Indian Art	2	-	-	2	Any
2	GESB03	Indian Traditional Knowledge System	2	-	-	2	Any
3	GEPS01	Indian Constitution	2	-	-	2	Any
Total Credits						6	

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xi. Value Education Courses

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	HS05	E-Waste and Environmental Management	2	-	-	2	Any
2	HS02T	Professional Skills	2	-	-	2	Any
3	HS02P	Professional Skills Lab	-	2	-	1	Any
4	GESB02	Universal Human Values	2	-	-	2	Any
5	GESB06	Responsibility towards sustainable environment	2	-	-	2	Any
6	GEPS02	Four Pillars of Democratic Nation	2	-	-	2	Any
7	GEWI01	Railways - Wonders of Infrastructure	2	-	-	2	Any
Total Credits						13	

xii. Research Methodology Courses

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

xiii. Community Engagement Project/ Field Project

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GESB08#	Social Service Internship/ Project	-	2	-	2	3
Total Credits						2	

For GESB08- Social Service Internship/ Project: 2 hours / week slot will be provided during the semester (in regular timetable). Additional work of 40 hours needs to be completed during the semester (besides regular timetable) or after the semester (during inter semester break).

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xiv. Project

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	IT50	Project	2	4	-	6	8
Total Credits						6	

xv. Internship/ On Job Training (OJT)

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	IT45	Mini Project	-	4	-	2	4
2	IT46	Minor Project-1	-	4	-	2	5
3	IT47	Minor Project-2(Synopsis)	-	4	-	2	6
4	IT48	Industry Internship		12		6	8
5	IT50	Project -2 (Final)	6	-	-	6	7
Total Credits						12	

xvi. Liberal Learning/ Co-curricular Courses

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1.	GENS01	Facets of Astronomy	2	-	-	2	Any
2.	GESB05	Global Citizenship Education	2	-	-	2	Any
3.	GEPEW02	IQ vs EQ	2	-	-	2	Any
4.	GEPEW03	Nutrition & Physical Wellness	2	-	-	2	Any
5.	GEA02	Various Dance Forms	2	-	-	2	Any
6.	GEPEW01	Wellness- Body, Mind & Spirit	2	-	-	2	Any
7.	LLCC1	Artisan Skills Development	2	-	-	2	Any
8.	LLCC2	Biodiversity	2	-	-	2	Any
9.	LLCC3	Civic Synergy: Navigating Governance, Laws, and Sustainability	2	-	-	2	Any
10.	LLCC4	Creative Writing	2	-	-	2	Any
11.	LLCC5	Critical Thinking and Problem Solving	2	-	-	2	Any
12.	LLCC6	Digital Literacy and Media Awareness	2	-	-	2	Any
13.	LLCC7	Financial Literacy for Engineers	2	-	-	2	Any
14.	LLCC8	Flavours of the world	2	-	-	2	Any

Programme Structure for NEP-2020 (R-2023) for Bachelor of Technology (B.Tech.)
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Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
15.	LLCC9	Impactful PowerPoint Presentations	2	-	-	2	Any
16.	LLCC10	Introduction to Taxation	2	-	-	2	Any
17.	LLCC11	Leadership and Personal Development	2	-	-	2	Any
18.	LLCC12	Mastering Advanced Excel	2	-	-	2	Any
19.	LLCC13	Natural Farming	2	-	-	2	Any
20.	LLCC14	Personal Grooming Essentials	2	-	-	2	Any
21.	LLCC15	Sketching and Painting As per syllabus name of the course is Rangoli: Sketching and Painting	2	-	-	2	Any
22.	LLCC16	Various Music Forms	2	-	-	2	Any
Total Credits						44	

Illustrative Semester wise
Credit Distribution Structure and Assessment Guidelines
(Based on NEP 2020 Guidelines)
for
Bachelor of Technology
in
Information Technology-One Major, One Minor

Programme Structure for NEP-2020 (R-2023) for Bachelor of Technology (B.Tech.)
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Semester		1	2	3	4	5	6	7	8	Total Credits
Sub-Category	Vertical									
Basic Science Course	BSC/ ESC	6	3	3	3					15
Engineering Science		6	6							12
Programme Core Course (PCC)	Program Courses (PC)			9	12	12	9	3		45
Programme Elective Course (PEC)						3	6	9		18
Multidisciplinary Minor (MDM)	Multidisciplinary Courses (MDC)			2		3	3	3	3	14
Open Elective (OE)					3				5	8
Vocational and Skill Enhancement Courses (VSEC)	Skill Courses (SC)	3	3		2					8
Ability Enhancement Courses (AEC)	Humanities Social Science and Management (HSSM)	3		1					3	15
Entrepreneurship/ Economics/ Management Courses (EEMC)			3							
Indian Knowledge System (IKS)				2						
Value Education Courses (VEC)				3						
Research Methodology (RM)	Experiential Learning Courses (ELC)								3	3
Comm. Engg. Project (CEP)/ Field Project (FP)				2						2
Project								6		6
Internship/ OJT					2	2	2		6	12
Co-curricular Courses (CC)	Liberal Learning Courses (LLC)	2	2							4
Total Credits		20	20	19	22	20	20	21	20	162

First Year B. Tech. Information Technology
Course Structure and Assessment Guidelines

Preferred Semester: I

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
BSC	BS01	Engineering Mathematics-I	Theory	3	20	30	50	100
	BS14T	Physics	Theory	2	15	20	40	075
	BS14P	Physics Lab	Lab	1	25	-	25	050
ESC	ES06T	Fundamentals of Computer Hardware and Networking	Theory	2	15	20	40	075
	ES06P	Fundamentals of Computer Hardware and Networking Lab	Lab	1	25	-	25	050
	ES07T	Fundamental of Logic Circuits	Theory	2	15	20	40	075
	ES07P	Fundamental of Logic Circuits Lab	Lab	1	25	-	25	050
SC_VSEC	ES04T	Structured Programming	Theory	2	15	20	40	075
	ES04P	Structured Programming Lab	Lab	1	25	-	25	050
HSSM_AEC	HSXXT	Any HSSM_AEC course offered	Theory	2	15	20	40	075
	HSXXP		Practical	1	25	-	25	050
LLC_CC	GEXX*	Any LLC_CC course from the list	Theory	2	25	-	50	075
Total Credits				20				

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

*Selection based on the subset of courses made available 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.

First Year B. Tech. Information Technology
Course Structure and Assessment Guidelines

Preferred Semester: II

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40 % of total marks)
	Code	Name			ISA	MSE	ESE	
BSC	BS03	Engineering Mathematics-II	Theory	3	20	30	50	100
ESC	ES01T	Engineering Graphics	Theory	2	15	20	40	075
	ES01P	Engineering Graphics Lab	Practical	1	25	-	25	050
	ES10	Computer Organization and Architecture	Theory	3	20	30	50	100
SC_VSEC	ES05T	Object-Oriented Programming	Theory	2	15	20	40	075
	ES05P	Object-Oriented Programming Lab	Lab	1	25	-	25	050
HSSM_EE MC	GEXX/HS06	Any HSSM_EEMC course	As per course	3	As per course			
LLC_CC	GEXX*	Any LLC_CC course	Theory	2	25	-	50	075
HSSM_VE C	GEXX*	Any HSSM_VEC course	As per course	3	As per course			
Total Credits				20				

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

*Selection based on the subset of courses made available 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.

Second Year B. Tech. Information Technology
Course Structure and Assessment Guidelines

Preferred Semester: III

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
BSC	BS41	Engineering Mathematics-III	Theory	3	20	30	50	100
PC_PCC	IT04T	Microprocessor	Theory	2	15	20	40	075
	IT04P	Microprocessor Lab	Practical	1	25	-	25	050
	IT02T	Advanced Java	Theory	2	15	20	40	075
	IT02P	Advanced Java Lab	Practical	1	25	-	25	050
	IT01T	Data Structure & Analysis	Theory	2	15	20	40	075
	IT01P	Data Structure & Analysis Lab	Practical	1	25	-	25	050
CEP/FP	GESB08	Social Service Internship/ Project	Practical	2	25	-	50	100
MDM	MDXX*	Any MDM Course	Theory	2	15	20	40	075
			Theory	2	As per course			075
HSSM_AEC	HS04	Presentation Skills	Practical	1	50	-	-	050
HSSM_IKS	GEXX*	Any HSSM_IKS course	As per course	2	As per course			
Total Credits				19				

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

*Selection of any one course based on the subset of courses made available 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.

Second Year B. Tech. Information Technology
Course Structure and Assessment Guidelines

Preferred Semester: IV

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
BSC	BS42	Engineering Mathematics-IV	Theory	3	20	30	50	100
PC_PCC	IT05T	Operating Systems	Theory	2	15	20	40	075
	IT05P	Operating Systems Lab	Practical	1	25	-	25	050
	IT06T	Computer Networks	Theory	2	15	20	40	075
	IT06P	Computer Networks Lab	Practical	1	25	-	25	050
	IT09	Automata Theory	Theory+ Tutorial	3	40	20	40	100
	IT07T	Database Management Systems	Theory	2	15	20	40	075
	IT07P	Database Management Systems Lab	Practical	1	25	-	25	050
SC_VSEC	IT08	Skill based Lab – Python	Practical	2	50	-	25	075
Internship/OJT	IT45	Mini Project	Practical	2	25	-	50	075
OE	OE*	Any OE course	Theory	3	As per course			100
Total Credits				22				

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

*Selection based on the subset of courses made available 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.

Second Year B. Tech. Information Technology - Summer Break

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).

Third Year B. Tech. Information Technology
Course Structure and Assessment Guidelines

Preferred Semester: V

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
PC_PCC	IT10T	Data warehousing & Mining	Theory	2	15	20	40	075
	IT10P	Data warehousing & Mining Lab	Practical	1	25	-	25	050
	IT11T	Artificial Intelligence & Machine Learning	Theory	2	15	20	40	075
	IT11P	Artificial Intelligence & Machine Learning Lab	Practical	1	25	-	25	050
	IT12T	Software Engineering with WDL	Theory	2	15	20	40	075
	IT12P	Software Engineering with WDL Lab	Practical	1	25	-	25	050
	IT15T	Mobile Communication & Computing	Theory	2	15	20	40	075
	IT15P	Mobile Communication & Computing Lab	Practical	1	25	-	25	050
PC_PEC	ITXXT	Professional Elective-1	Theory	2	15	20	40	075
	ITXXP	Professional Elective-1 Lab	Practical	1	25	-	25	050
Int./OJT	IT46	Minor Project-1	Practical	2	25	-	50	075
MDM	MDXX*	As per MDM course list	As per course	3	As per course			

Programme Structure for NEP-2020 (R-2023) for Bachelor of Technology (B.Tech.)
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OJT	GE01	Internship with other Institutes (Credit Transfer)	Theory	4	As per course(During Summer break of sem IV and V)	125
Total Credits				24		

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

*Selection based on the subset of courses made available 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.

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.

Professional Elective-1 Courses (ITXX)

Course Code	Course Name	Specialization Track Name#
IT21T	Artificial Intelligence	Artificial Intelligence & Machine Learning (AIML)
IT21P	Artificial Intelligence Lab	
IT22T	Advanced Database Management System	Data Analytics
IT22P	Advanced Database Management System Lab	
IT23T	Modern Sensors for IoT	IoT
IT23P	Modern Sensors for IoT Lab	
IT24T	Cryptography and Network Security	Cyber Security (CSec)
IT24P	Cryptography and Network Security Lab	

#For details of Specialization Certificate, refer Appendix-A

Third Year B. Tech. Information Technology
Course Structure and Assessment Guidelines

Preferred Semester: VI

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40 % of total marks)
	Code	Name			ISA	MSE	ESE	
PC_PCC	IT13T	Cloud Computing	Theory	2	15	20	40	075
	IT13P	Cloud Computing Lab	Practical	1	25	-	25	050
	IT03T	Computer Graphics	Theory	2	15	20	40	075
	IT03P	Computer Graphics Lab	Practical	1	25	-	25	050
	IT14T	Software Testing & Quality Assurance	Theory	2	15	20	40	075
	IT14P	Software Testing & Quality Assurance Lab	Practical	1	25	-	25	050
PC_PEC	ITXXT	Professional Elective-2	Theory	2	15	20	40	075
	ITXXP	Professional Elective-2 Lab	Practical	1	25	-	25	050
	ITXXT	Professional Elective-3	Theory	2	15	20	40	075
	ITXXP	Professional Elective-3 Lab	Practical	1	25	-	25	050
Int./OJT	IT47	Minor Project-2 (Synopsis)	Theory	2	25	-	50	075
MDM	MDXX*	As per MDM course list	As per course	3	As per course			
Total Credits				20				

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

*Selection based on the subset of courses made available 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.

Programme Structure for NEP-2020 (R-2023) for Bachelor of Technology (B.Tech.)
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Professional Elective-2 Courses (ITXX)

Course Code	Course Name	Specialization Track Name#
IT25T	Soft Computing	Artificial Intelligence & Machine Learning (AIML)
IT25P	Soft Computing Lab	
IT26T	Data & Feature Engineering	Data Analytics
IT26P	Data & Feature Engineering Lab	
IT27T	Principles of IOT	IoT
IT27P	Principles of IOT Lab	
IT28T	System Security and Ethical Hacking	Cyber Security (CSec)
IT28P	System Security and Ethical Hacking Lab	

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-3 Courses (ITXX)

Course Code	Course Name	Specialization Track Name#
IT29T	Probabilistic Graphical Model	Artificial Intelligence & Machine Learning (AIML)
IT29P	Probabilistic Graphical Model Lab	
IT29T	Probabilistic Graphical Model	Data Analytics
IT29P	Probabilistic Graphical Model Lab	
IT31T	Embedded System Design with tiny OS	IoT
IT31P	Embedded System Design with tiny OS Lab	
IT32T	Digital Forensics	Cyber Security (CSec)
IT32P	Digital Forensics Lab	

#For details of Specialization Certificate, refer Appendix-A

Final Year B. Tech. Information Technology
Course Structure and Assessment Guidelines

Preferred Semester: VII

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
PC_PCC	IT16T	DevOps	Theory	2	50	-	25	075
	IT16P	DevOps Lab	Practical	1	25	-	25	050
PC_PEC	ITXXT	Professional Elective-4	Theory	2	15	20	40	075
	ITXXP	Professional Elective-4 Lab	Practical	1	25	-	25	050
	ITXXT	Professional Elective-5	Theory	2	15	20	40	075
	ITXXP	Professional Elective-5 Lab	Practical	1	25	-	25	050
	ITXXT	Professional Elective-6	Theory	2	15	20	40	075
	ITXXP	Professional Elective-6 Lab	Practical	1	25	-	25	050
Project	IT50	Project-2 (Final)	Theory+ Practical	6	100	-	100	200
MDM	MDXX*	Any MDM course	Theory	3	25	-	50	75
Total Credits				21				

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

Professional Elective-4 Courses (ITXX)

Course Code	Course Name	Specialization Track Name#
IT33T	Data Analytics & Visualization	Artificial Intelligence and Machine Learning (AIML)
IT33P	Data Analytics & Visualization Lab	
IT34T	Big Data Analytics	Data Analytics (DA)
IT34P	Big Data Analytics Lab	
IT35T	IoT and Edge Computing	Internet of Things (IoT)
IT35P	IoT and Edge Computing Lab	
IT36T	Mobile and Wireless Security	Computer Security (CSec)
IT36P	Mobile and Wireless Security Lab	

#For details of Specialization Certificate, refer Appendix-A

Programme Structure for NEP-2020 (R-2023) for Bachelor of Technology (B.Tech.)
Information Technology

Professional Elective-5 Courses (ITXX)

Course Code	Course Name	Specialization Track Name#
IT37T	Deep Learning	Artificial Intelligence and Machine Learning (AIML)
IT37P	Deep Learning Lab	
IT38T	Recommendation Systems	Data Analytics (DS)
IT38P	Recommendation Systems Lab	
IT39T	IoT Security and Trust	Internet of Things (IoT)
IT39P	IoT Security and Trust Lab	
IT40T	Web Application Security	Cyber Security (CSec)
IT40P	Web Application Security Lab	

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-6 Courses (ITXX)

Course Code	Course Name	Specialization Track Name#
IT41T	Natural language processing	Artificial Intelligence and Machine Learning (AIML)
IT41P	Natural language processing Lab	
IT41T	Text, Web & Social Media Analytics	Data Analytics (DS)
IT41P	Text, Web & Social Media Analytic Lab	
IT42T	Industrial IOT	Internet of Things (IoT)
IT42P	Industrial IOT Lab	
IT43T	Malware Analysis	Computer Security (CSec)
IT43P	Malware Analysis Lab	

#For details of Specialization Certificate, refer Appendix-A

Final Year B. Tech. Information Technology
Course Structure and Assessment Guidelines

Preferred Semester: VIII

NEP-Vertical	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
MDM_OE	OEXX*	Any three from the offered	Theory	3	20	30	50	100
	OEXX*	Open Elective courses	Theory	2	15	20	40	075
Int./OJT	IT48	Industry Internship	Internship	6	100	-	100	200
ELC_RM	OE07	Research Methodology	Theory	3	20	30	50	100
HSSM_ALC	HSXX*	Any HSSM course	As per course	3	As per course			
MDM	MDXX*	Any MDM course	Theory	3	As per course			100
Total Credits				20				

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

*Selection is based on subset of 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 5 professional elective courses (both Theory and Practical Components) as a part of minimum requirement for B.Tech. degree.

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

1. Artificial Intelligence and Machine Learning (AIML)
2. Data Analytics(DA)
3. Cyber Security
4. IoT (CSL)

From semester 5 to semester 8, learners can take courses from any track. **However, if learners complete all professional elective courses from the same chosen track from semester 5 to semester 8, they will be eligible to receive a Specialization Certificate from the Institute.**

Learners who choose professional elective courses from different specialisation tracks from semester 5 to semester 8 will not be eligible for a Specialization Certificate.

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

AIML track: Courses to be chosen for specialization in Artificial Intelligence and Data Science

Semester	Course Code	Course Name
V	IT21T	Artificial Intelligence
	IT21P	Artificial Intelligence Lab
VI	IT25T	Soft Computing
	IT26P	Soft Computing Lab
VI	IT29T	Probabilistic Graphical Model
	IT29P	Probabilistic Graphical Model Lab
VII	IT33T	Data Analytics & Visualization
	IT33P	Data Analytics & Visualization Lab
VII	IT37T	Deep Learning
	IT37P	Deep Learning Lab
VIII	IT41T	Natural Language Processing
	IT41P	Natural Language Processing Lab

Data Analytics : Courses to be chosen for specialization in Data Analytics

Semester	Course Code	Course Name
V	IT22T	Advanced Database System
	IT22P	Advanced Database System Lab
VI	IT26T	Data and Feature Engineering
	IT26P	Data and Feature Engineering Lab
VI	IT29T	Probabilistic Graphical Model
	IT29P	Probabilistic Graphical Model Lab
VII	IT34T	Big Data Analytics
	IT34P	Big Data Analytics Lab
VII	IT38T	Recommendation System
	IT38P	Recommendation System Lab
VIII	IT42T	Text, Web & Social Media Analytics
	IT42P	Text, Web & Social Media Analytics Lab

IoT : Courses to be chosen for specialization in IoT

Semester	Course Code	Course Name
V	IT23T	Modern Sensors for IoT
	IT23P	Modern Sensors for IoT Lab
VI	IT27T	Principles of IoT
	IT27P	Principles of IoT Lab
VI	IT31T	Embedded System Design with Tiny OS
	IT31P	Embedded System Design with Tiny OS Lab
VII	IT35T	IoT Network & Protocols & Edge Computing
	IT35P	IoT Network & Protocols & Edge Computing Lab
VII	IT39T	IoT Security & Trust
	IT39P	IoT Security & Trust Lab
VIII	IT43T	Industrial IoT
	IT43P	Industrial IoT Lab

CSL track: Courses to be chosen for specialization in Cyber Security

Semester	Course Code	Course Name
V	IT24T	Computer & Network Security
	IT24P	Computer & Network Security Lab
VI	IT28T	System Security & Ethical Hacking
	IT28P	System Security & Ethical Hacking Lab
VI	IT32T	Digital Forensic
	IT32P	Digital Forensic Lab
VII	IT36T	Mobile and Wireless Security
	IT36P	Mobile and Wireless Security Lab
VII	IT40T	Malware Analysis
	IT40P	Malware Analysis Lab
VIII	IT44T	Web Application Security
	IT44P	Web Application Security Lab

**(Draft copy of Programme Scheme and Syllabus
NEP 2020 (R-2023), Subject to approval of Academic
Council, Vidyalankar Institute of Technology)**