Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

Bachelor of Technology

in

Information Technology

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 the 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 begin 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 curriculum, ensuring employability. Open Elective courses cover multi-disciplinary, special skill development, project management and similar knowledge that make learners capable of working in an 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. In addition to this, the curriculum is augmented with Life Enrichment audit courses for knowledge inspiring experience.

Additionally, curriculum provides add-on Honours/Minor degree that involves field/ domain study. Learner can avail 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 Information Technology
Vidyalankar Institute of Technology

Chairman, Academic Council
Vidyalankar Institute of Technology

COMPETENCE BASED CATEGORIES AND CREDIT ALLOTMENT

Sr. No.	Competence	Course Category	Credits / Audit
I	Knowledge	Basic Science	20
II		Engineering Science	15
III		Core	47
IV	Skill	Professional Elective	18
V		Open Elective	15
VI		Project and Internship	18
VII	Attitude	Humanities, Social Sciences and Management	14
VIII		General Education	14
Total			**161**

Learner is expected to complete requirement of 161 credits (with minimum credits under each category as mentioned above) for B.Tech. degree in Information Technology.

Additionally, learners can choose to avail Honours/Minor Degree by completing requirements of 18 credits, which will be over and above the 161 credits required for B.Tech. degree.

Structure of Honours/Minor Degree (Add-on Certification)

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

For details of add-on Honours/Minor Degree refer to Honours/Minor Degree document of B.Tech. Information Technology Programme applicable for R-2022 curriculum.

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 Categories

I. Basic Science Courses

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	BS05	Engineering Mathematics-III	3	-	-	3	3
6	BS17	Biology	2	-	-	2	3
7	BS07	Engineering Mathematics-IV	3	-	-	3	4
8	BS12	Engineering Mathematics-V	3	-	-	3	5

***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	ES01T*	Engineering Graphics	2	-	-	2	2
2	ES01P*	Engineering Graphics Lab	-	2	-	1	2
3	ES04T*	Structured Programming	2	-	-	2	1
4	ES04P*	Structured Programming Lab	-	2	-	1	1
5	ES05T*	Object-Oriented Programming	2	-	-	2	2
6	ES05P*	Object-Oriented Programming Lab	-	2	-	1	2
7	ES06T*	Fundamentals of Computer Hardware and Networking	2	-	-	2	1
8	ES06P*	Fundamentals of Computer Hardware and Networking Lab	-	2	-	1	1
9	ES07T*	Fundamental of Logic Circuits	2	-	-	2	2
10	ES07P*	Fundamental of Logic Circuits 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	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	IT03T	Computer Graphics	2	-	-	2	3
6	IT03P	Computer Graphics Lab	-	2	-	1	3
7	IT04T	Computer Organization & Microprocessor	2	-	-	2	3
8	IT04P	Computer Organization & 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
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
15	IT08	Skill based Lab – Python	-	4	-	2	4
16	IT09	Automata Theory	2	-	1	3	5
17	IT10T	Data warehousing & Mining	2	-	-	2	5
18	IT10P	Data warehousing & Mining Lab	-	2	-	1	5
19	IT11T	Advanced Data Structure & Algorithm	2	-	-	2	5
20	IT11P	Advanced Data Structure & Algorithm 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
25	IT14T	Software Testing & Quality Assurance	2	-	-	2	6
26	IT14P	Software Testing & Quality Assurance Lab	-	2	-	1	6
27	IT15T	Machine Learning	2	-	-	2	6
28	IT15P	Machine Learning Lab	-	2	-	1	6
29	IT16T	DevOps	1	-	-	1	6
30	IT16P	DevOps Lab	-	2	-	1	6

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
31	IT18	Mobile App Development Lab	-	2	-	1	6

IV. Professional 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 Management System	2	-	-	2	5
4	IT22P	Advanced Database Management System Lab	-	2	-	1	5
5	IT23T	Modern Sensors for IoT	2	-	-	2	5
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	6
18	IT29P	Probabilistic Graphical Model Lab	-	2	-	1	6
19	IT29T	Probabilistic Graphical Model	2	-	-	2	6
20	IT29P	Probabilistic Graphical Model Lab	-	2	-	1	6
21	IT31T	Embedded System Design with Tiny OS	2	-	-	2	6
22	IT31P	Embedded System Design with Tiny OS Lab	-	2	-	1	6
23	IT32T	Digital Forensic	2	-	-	2	6
24	IT32P	Digital Forensic Lab	-	2	-	1	6

Sr. No.	Course Code	Course Title	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
25	IT33T	Data Analytics & Visualization	2	-	-	2	7
26	IT33P	Data Analytics & Visualization Lab	-	2	-	1	7
27	IT34T	Big Data Analytics	2	-	-	2	7
28	IT34P	Big Data Analytics Lab	-	2	-	1	7
29	IT35T	IoT Network & Protocols & Edge Computing	2	-	-	2	7
30	IT35P	IoT Network & Protocols & Edge Computing Lab	-	2	-	1	7
31	IT36T	Mobile and Wireless Security	2	-	-	2	7
32	IT36P	Mobile and Wireless Security Lab	-	2	-	1	7
33	IT37T	Deep Learning	2	-	-	2	7
34	IT37P	Deep Learning Lab	-	2	-	1	7
35	IT38T	Recommendation System	2	-	-	2	7
36	IT38P	Recommendation System Lab	-	2	-	1	7
37	IT39T	IoT Security & Trust	2	-	-	2	7
38	IT39P	IoT Security & Trust Lab	-	2	-	1	7
39	IT40T	Malware Analysis	2	-	-	2	7
40	IT40P	Malware Analysis Lab	-	2	-	1	7
41	IT41T	Natural Language Processing	2	-	-	2	7
42	IT41P	Natural Language Processing Lab	-	2	-	1	7
43	IT42T	Text, Web & Social Media Analytics	2	-	-	2	7
44	IT42P	Text, Web & Social Media Analytics Lab	-	2	-	1	7
45	IT43T	Industrial IoT	2	-	-	2	7
46	IT43P	Industrial IoT Lab	-	2	-	1	7
47	IT44T	Web Application Security	2	-	-	2	7
48	IT44P	Web Application Security 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	7
2	OE22	Project Management	3	-	-	3	7
3	OE23	Product Lifecycle Management	3	-	-	3	7

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

VI. Project and Internship

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	-	4	-	2	6
4	IT48	Industry Internship	-	150 (Total)	-	5	Break after Sem 6
5	IT49	Project-1 (Synopsis)	3	-	-	3	7
6	IT50	Project-2 (Final)	-	8	-	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	HS03	Technical and Business Writing	1	2	-	2	3
6	HS04	Presentation Skills	-	2	-	1	5
7	HS05*	E-waste and Environmental Management	2	-	-	2	1
8	HS06	Principles of Economics and Management	2	-	1	3	4

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

VIII. General Education

GE Sub-Category	GE Sub-Category Code
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

List of Courses under General Education (GE)Category

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	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 (INFT)	2
GEF02	Financial Management for Engineers	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 required 14 credits, under GE category are exempted for Direct Second Year (DSY) students who will secure admission through lateral entry from the AY 2023-24. Such students can opt for any courses from the above list to fulfill the required credits for the award of a degree.

Course Structure and Assessment Guidelines

for

Bachelor of Technology

in

Information Technology

First Year B. Tech. Information Technology **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
HS05	E-waste and Environmental Management	Theory	2	15	20	40	075
BS01	Engineering Mathematics-I	Theory	3	20	30	50	100
BS14T	Physics	Theory	2	15	20	40	075
BS14P	Physics Lab	Practical	1	25	-	25	050
ES04T	Structured Programming	Theory	2	15	20	40	075
ES04P	Structured Programming Lab	Practical	1	25	-	25	050
ES06T	Fundamentals of Computer Hardware and Networking	Theory	2	15	20	40	075
ES06P	Fundamentals of Computer Hardware and Networking Lab	Practical	1	25	-	25	050
GEXX*	Any GE course from the below list	As per course	2	As per course			
		Total	**19**				

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 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.

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. Information Technology **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
BS03	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
ES05T	Object-Oriented Programming	Theory	2	15	20	40	075
ES05P	Object-Oriented Programming Lab	Practical	1	25	-	25	050
ES07T	Fundamental of Logic Circuits	Theory	2	15	20	40	075
ES07P	Fundamental of Logic Circuits Lab	Practical	1	25	-	25	050
GECI01T	Design Thinking	Theory	2	15	20	40	075
GECI01P	Design Thinking Lab	Practical	1	50	-	-	050
GEXX*	Any GE course from the below list	As per course	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 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.

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
GEC02	Innovation and Entre...						
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. Information Technology **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	
HS03	Technical and Business Writing	Theory + Practical	2	75	-	-	075
BS05	Engineering Mathematics-III	Theory	3	20	30	50	100
IT01T	Data Structure & Analysis	Theory	2	15	20	40	075
IT01P	Data Structure & Analysis Lab	Practical	1	25	-	25	050
IT02T	Advanced Java	Theory	2	15	20	40	075
IT02P	Advanced Java Lab	Practical	1	25	-	25	050
IT03T	Computer Graphics	Theory	2	15	20	40	075
IT03P	Computer Graphics Lab	Practical	1	25	-	25	050
IT04T	Computer Organization & Microprocessor	Theory	2	15	20	40	075
IT04P	Computer Organization & Microprocessor Lab	Practical	1	25	-	25	050
BS17	Biology	Theory	2	15	20	40	075
GESB01[#]	Social Service Internship/ Project	Practical	3	-	-	100	100
		Total	**22**				

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESE= 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, result of courses completed in the inter- semester break will appear in the marksheet of the next 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 **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	
HS06	Principles of Economics and Management	Theory + Tutorial	3	40	20	40	100
BS07	Engineering Mathematics-IV	Theory	3	20	30	50	100
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
IT07T	Database Management Systems	Theory	2	15	20	40	075
IT07P	Database Management Systems Lab	Practical	1	25	-	25	050
IT08	Skill based Lab – Python	Practical	2	25	-	50	075
IT45	Mini Project	Practical	2	25	-	50	075
		Total	**19**				
Course credits completed during the previous inter-semester break will appear in this semester's marksheet							
GESB01#	Social Service Internship/ Project	Practical	3	-	-	100	100

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.

Second Year B. Tech. Information Technology – 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 result of courses completed in the inter- semester break will appear in the marksheet of the next semester.

Third Year B. Tech. Information Technology **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	
HS04	Presentation Skills	Practical	1	50	-	-	050
BS12	Engineering Mathematics-V	Theory	3	20	30	50	100
IT09	Automata Theory	Theory + Tutorial	3	40	20	40	100
IT10T	Data warehousing & Mining	Theory	2	15	20	40	075
IT10P	Data warehousing & Mining Lab	Practical	1	25	-	25	050
IT11T	Advanced Data Structure & Algorithm	Theory	2	15	20	40	075
IT11P	Advanced Data Structure & Algorithm 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
IT46	Minor Project-1	Practical	2	25	-	50	075
ITXX	Professional Elective-1	As per course	3	As per course			
		Total	**21**				
Course credits completed during the previous inter-semester break will appear in this semester's marksheet							
GE01	Internship with other Institutes (Credit Transfer)	As per course	4	125	-	-	125

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.

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

Specialization Track Name[#]	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Artificial Intelligence and Machine Learning (AIML)	IT21T	Artificial Intelligence	Theory	2	15	20	40	075
	IT21P	Artificial Intelligence Lab	Practical	1	25	-	25	050
Data Science (DS)	IT22T	Advanced Database Management System	Theory	2	15	20	40	075
	IT22P	Advanced Database Management System Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	IT23T	Modern Sensors for IoT	Theory	2	15	20	40	075
	IT23P	Modern Sensors for IoT Lab	Practical	1	25	-	25	050
Cyber Security (CSec)	IT24T	Computer & Network Security	Theory	2	15	20	40	075
	IT24P	Computer & Network Security Lab	Practical	1	25	-	25	050

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

Guidelines for Award of Honours/ Minor 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. Information Technology **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	
IT13T	Cloud Computing	Theory	2	15	20	40	075
IT13P	Cloud Computing 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
IT15T	Machine Learning	Theory	2	15	20	40	075
IT15P	Machine Learning Lab	Practical	1	25	-	25	050
IT16T	DevOps	Theory	1	50	-	-	050
IT16P	DevOps Lab	Practical	1	25	-	25	050
IT18	Mobile App Development Lab	Practical	1	25	-	25	050
IT47	Minor Project-2	Practical	2	25	-	50	075
ITXX	Professional Elective-2	As per course	3	As per course			
ITXX	Professional Elective-3	As per course	3	As per course			
		Total	**20**				

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.

Professional Elective-2 Courses (ITXX)

Specialization Track Name#	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Artificial Intelligence and Machine Learning (AIML)	IT25T	Soft Computing	Theory	2	15	20	40	075
	IT25P	Soft Computing Lab	Practical	1	25	-	25	050

Specialization Track Name#	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Data Science (DS)	IT26T	Data & Feature Engineering	Theory	2	15	20	40	075
	IT26P	Data & Feature Engineering Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	IT27T	Principles of IoT	Theory	2	15	20	40	075
	IT27P	Principles of IoT Lab	Practical	1	25	-	25	050
Cyber Security (CSec)	IT28T	System Security & Ethical Hacking	Theory	2	15	20	40	075
	IT28P	System Security & Ethical Hacking Lab	Practical	1	25	-	25	050

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-3 Courses (ITXX)

Specialization Track Name#	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Artificial Intelligence and Machine Learning (AIML)	IT29T	Probabilistic Graphical Model	Theory	2	15	20	40	075
	IT29P	Probabilistic Graphical Model Lab	Practical	1	25	-	25	050
Data Science (DS)	IT29T	Probabilistic Graphical Model	Theory	2	15	20	40	075
	IT29P	Probabilistic Graphical Model Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	IT31T	Embedded System Design with Tiny OS	Theory	2	15	20	40	075
	IT31P	Embedded System Design with Tiny OS Lab	Practical	1	25	-	25	050
Cyber Security (CSec)	IT32T	Digital Forensics	Theory	2	15	20	40	075
	IT32P	Digital Forensics Lab	Practical	1	25	-	25	050

#For details of Specialization Certificate, refer Appendix-A

Third Year B. Tech. Information Technology - Summer Break

Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
Code	Name			ISA	MSE	ESE	
IT48*	Industry Internship	Practical	5	75	-	75	150

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

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

Final Year B. Tech. Information Technology **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	
ITXX	Professional Elective-4	As per course	3	As per course			
ITXX	Professional Elective-5	As per course	3	As per course			
ITXX	Professional Elective-6	As per course	3	As per course			
OEXX*	Any two from the offered Open Elective courses	Theory	3	20	30	50	100
OEXX*		Theory	3	20	30	50	100
IT49	Project-1 (Synopsis)	Theory	3	50	-	50	100
		Total	**18**				
Course credits completed during the previous inter-semester break will appear in this semester's marksheet							
IT48	Industry Internship	Practical	5	75	-	75	150

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

Specialization Track Name#	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Artificial Intelligence and Machine Learning (AIML)	IT33T	Data Analytics & Visualization	Theory	2	15	20	40	075
	IT33P	Data Analytics & Visualization Lab	Practical	1	25	-	25	050
Data Science (DS)	IT34T	Big Data Analytics	Theory	2	15	20	40	075

Specialization Track Name#	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
	IT34P	Big Data Analytics Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	IT35T	IoT Network & Protocols & Edge Computing	Theory	2	15	20	40	075
	IT35P	IoT Network & Protocols & Edge Computing Lab	Practical	1	25	-	25	050
Cyber Security (CSec)	IT36T	Mobile and Wireless Security	Theory	2	15	20	40	075
	IT36P	Mobile and Wireless Security Lab	Practical	1	25	-	25	050

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-5 Courses (ITXX)

Specialization Track Name#	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Artificial Intelligence and Machine Learning (AIML)	IT37T	Deep Learning	Theory	2	15	20	40	075
	IT37P	Deep Learning Lab	Practical	1	25	-	25	050
Data Science (DS)	IT38T	Recommendation System	Theory	2	15	20	40	075
	IT38P	Recommendation System Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	IT39T	IoT Security & Trust	Theory	2	15	20	40	075
	IT39P	IoT Security & Trust Lab	Practical	1	25	-	25	050
Cyber Security (CSec)	IT40T	Malware Analysis	Theory	2	15	20	40	075
	IT40P	Malware Analysis Lab	Practical	1	25	-	25	050

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-6 Courses (ITXX)

Specialization Track Name[#]	Course		Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
	Code	Name			ISA	MSE	ESE	
Artificial Intelligence and Machine Learning (AIML)	IT41T	Natural Language Processing	Theory	2	15	20	40	075
	IT41P	Natural Language Processing Lab	Practical	1	25	-	25	050
Data Science (DS)	IT42T	Text, Web & Social Media Analytics	Theory	2	15	20	40	075
	IT42P	Text, Web & Social Media Analytics Lab	Practical	1	25	-	25	050
Internet of Things (IoT)	IT43T	Industrial IoT	Theory	2	15	20	40	075
	IT43P	Industrial IoT Lab	Practical	1	25	-	25	050
Cyber Security (CSec)	IT44T	Web Application Security	Theory	2	15	20	40	075
	IT44P	Web Application Security Lab	Practical	1	25	-	25	050

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

Final Year B. Tech. Information Technology **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	
OEXX*	Any three from the offered Open Elective courses	Theory	3	20	30	50	100
OEXX*		Theory	3	20	30	50	100
OEXX*		Theory	3	20	30	50	100
IT50	Project-2 (Final)	Theory & Practical	4	75	-	50	125
		Total	**13**				

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESE= 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 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 Science (DS)
3. Cyber Security (CSec)
4. Internet of Things (IoT)

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
	IT25P	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
VII	IT41T	Natural Language Processing
	IT41P	Natural Language Processing Lab

Data Science Track: Courses to be chosen for specialization in Data Science

Semester	Course Code	Course Name
V	IT22T	Advanced Database Management System
	IT22P	Advanced Database Management System Lab
VI	IT26T	Data and Feature Engineering
	IT26P	Data and Feature Engineering
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
VII	IT42T	Text, Web & Social Media Analytics
	IT42P	Text, Web & Social Media Analytics Lab

IoT Track: 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
VII	IT43T	Industrial IoT
	IT43P	Industrial IoT Lab

CSec 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
VII	IT44T	Web Application Security
	IT44P	Web Application Security Lab