
# 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.

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) | 03 |
| XIV | | Project | 06 |
| XV | | Internship/ OJT | 12 |
| XVI | Liberal Learning Courses | Co-Curricular Courses (CC) | 04 |
| **Total** | | | **163** |

Learner is expected to complete requirement of 163 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

### 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 | BS05 | Engineering Mathematics-III | 3 | - | - | 3 | 3 |
| 7 | BS12 | Engineering Mathematics-V | 3 | - | - | 3 | 4 |
| | | | | | 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 |

| 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 | Soft Computing | 2 | - | - | 2 | 5 |
| 2 | IT21P | Soft Computing Lab | - | 2 | - | 1 | 5 |
| 3 | IT22T | Big Data Analytics | 2 | - | - | 2 | 5 |
| 4 | IT22P | Big Data Analytics Lab | - | 2 | - | 1 | 5 |
| 5 | IT23T | Micro-controller & Embedded System | 2 | - | - | 2 | 5 |
| 6 | IT23P | Micro-controller & Embedded System Lab | - | 2 | - | 1 | 5 |

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---|---|---|---|---|---|---|---|
| | | | Theory | Practical | Tutorial | | |
| 7 | IT24T | Computer & Network Security | 2 | - | - | 2 | 5 |
| 8 | IT24P | Computer & Network Security Lab | - | 2 | - | 1 | 5 |
| 9 | IT25T | Deep Learning | 2 | - | - | 2 | 6 |
| 10 | IT25P | Deep Learning Lab | - | 2 | - | 1 | 6 |
| 11 | IT26T | Natural Language Processing | 2 | - | - | 2 | 6 |
| 12 | IT26P | Natural Language Processing Lab | - | 2 | - | 1 | 6 |
| 13 | IT27T | Internet of Things | 2 | - | - | 2 | 6 |
| 14 | IT27P | Internet of Things 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 | Information Retrieval | 2 | - | - | 2 | 7 |
| 18 | IT29P | Information Retrieval Lab | - | 2 | - | 1 | 7 |
| 19 | IT30T | Deep Learning | 2 | - | - | 2 | 7 |
| 20 | IT30P | Deep Learning Lab | - | 2 | - | 1 | 7 |
| 21 | IT31T | Wireless Sensor Network | 2 | - | - | 2 | 7 |
| 22 | IT31P | Wireless Sensor Network Lab | - | 2 | - | 1 | 7 |
| 23 | IT32T | Digital Forensic | 2 | - | - | 2 | 7 |
| 24 | IT32P | Digital Forensic Lab | - | 2 | - | 1 | 7 |
| 25 | IT33T | AI in Healthcare | 2 | - | - | 2 | 7 |
| 26 | IT33P | AI in Healthcare Lab | - | 2 | - | 1 | 7 |
| 27 | IT34T | Recommender System | 2 | - | - | 2 | 7 |
| 28 | IT34P | Recommender System Lab | - | 2 | - | 1 | 7 |
| 29 | IT35T | IoT Network & Protocols | 2 | - | - | 2 | 7 |
| 30 | IT35P | IoT Network & Protocols Lab | - | 2 | - | 1 | 7 |
| 31 | IT36T | Infrastructure Security | 2 | - | - | 2 | 7 |
| 32 | IT36P | Infrastructure Security Lab | - | 2 | - | 1 | 7 |
| 33 | IT37T | Reinforcement Learning | 2 | - | - | 2 | 7 |
| 34 | IT37P | Reinforcement Learning Lab | - | 2 | - | 1 | 7 |
| 35 | IT38T | Semantic Web | 2 | - | - | 2 | 7 |
| 36 | IT38P | Semantic Web Lab | - | 2 | - | 1 | 7 |
| 37 | IT39T | Internet of Everything | 2 | - | - | 2 | 7 |
| 38 | IT39P | Internet of Everything Lab | - | 2 | - | 1 | 7 |
| 39 | IT40T | Intrusion Detection & Prevention | 2 | - | - | 2 | 7 |

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---|---|---|---|---|---|---|---|
| | | | Theory | Practical | Tutorial | | |
| 40 | IT40P | Intrusion Detection & Prevention Lab | - | 2 | - | 1 | 7 |
| 41 | IT41T | Cloud Deployment of ML | 2 | - | - | 2 | 8 |
| 42 | IT41P | Cloud Deployment of ML Lab | - | 2 | - | 1 | 8 |
| 43 | IT42T | Industrial Applications of DS | 2 | - | - | 2 | 8 |
| 44 | IT42P | Industrial Applications of DS Lab | - | 2 | - | 1 | 8 |
| 45 | IT43T | IoT Platform & System Design | 2 | - | - | 2 | 8 |
| 46 | IT43P | IoT Platform & System Design Lab | - | 2 | - | 1 | 8 |
| 47 | IT44T | Block Chain | 2 | - | - | 2 | 8 |
| 48 | IT44P | Block Chain Lab | - | 2 | - | 1 | 8 |
| | | | | | Total Credits | 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 |
| 2 | BS19 | Chemistry | 2 | - | - | 2 | 3 |
| 3 | OE13 | Principle of Communication Engineering | 2 | - | - | 2 | 3 |
| 4 | OE02 | Project Management | 3 | - | - | 3 | 7 or 8 |
| 5 | OE03 | Product Lifecycle Management | 3 | - | - | 3 | 7 or 8 |
| 6 | OE04 | Sustainability Management | 3 | - | - | 3 | 7 or 8 |
| 7 | GESB07 | Psychology | 2 | - | - | 2 | Any |
| 8 | GENS02 | Modern Farming | 2 | - | - | 2 | Any |
| | | | | | Total Credits | 17 | |

**vi. Open Elective Courses**

| Sr. No. | Course Code | Course Name | Hours Per Week | | | Credits | Preferred Semester |
|---|---|---|---|---|---|---|---|
| | | | Theory | Practical | Tutorial | | |
| 1 | OE01 | Cyber Law | 3 | - | - | 3 | 7 or 8 |
| 2 | OE05 | Operation Research | 3 | - | - | 3 | 7 or 8 |
| 3 | OE06 | IPR and Patenting | 2 | - | - | 2 | 7 or 8 |
| 4 | OE08 | Renewable Energy Management | 3 | - | - | 3 | 7 or 8 |

| Sr. No. | Course Code | Course Name | Hours Per Week | | | Credits | Preferred Semester |
|---|---|---|---|---|---|---|---|
| | | | Theory | Practical | Tutorial | | |
| 5 | OE09 | Energy Audit and Management | 3 | - | - | 3 | 7 or 8 |
| 6 | OE10 | E-Farming | 2 | - | - | 2 | 7 or 8 |
| 7 | OE11 | Bioinformatics | 3 | - | - | 3 | 7 or 8 |
| 8 | OE12 | Nanotechnology | 3 | - | - | 3 | 7 or 8 |
| | | | | | Total Credits | 22 | |

**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 | |

### 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 | GESB01# | Social Service Internship/ Project | - | 2 | - | 3 | 3 |
| | | | | | Total Credits | 3 | |

**# 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).

**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 | - | 4 | - | 2 | 6 |
| 4 | IT48 | Industry Internship | | | | 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 | GEA02 | Various Dance Forms | 2 | - | - | 2 | Any |
| 2 | GESB05 | Global Citizenship Education | 2 | - | - | 2 | Any |
| 3 | GEPEW01 | Wellness – Body, Mind & Spirit | 2 | - | - | 2 | Any |

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---|---|---|---|---|---|---|---|
| | | | Theory | Practical | Tutorial | | |
| 4 | GEPEW02 | IQ vs EQ | 2 | - | - | 2 | Any |
| 5 | GEPEW03 | Nutrition and Physical Wellness | 2 | - | - | 2 | Any |
| 6 | GENS01 | Facets of Astronomy | 2 | - | - | 2 | Any |
| | | | | | Total Credits | 12 | |

# 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

| Semester | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Total Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| Sub-Category | Vertical | | | | | | | | | |
| Basic Science Course (BS) | BSC/ ESC | 6 | 3 | 3 | 3 | | | | | 15 |
| Engineering Science(ES) | | 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) | | | 5 | 3 | 3 | 3 | | | 14 |
| Open Elective (OE) | | | | | | | | | 8 | 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 | 6 | 1 | | | | 2 | 3 | 15 |
| Entrepreneurship/ Economics/ Management Courses (EEMC) | | | | | | | | | | |
| Indian Knowledge System (IKS) | | | | | | | | | | |
| Value Education Courses (VEC) | | | | | | | | | | |
| 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 | 20 | 20 | 20 | 20 | 20 | 22 | 162 |

**First Year B. Tech. Information Technology** **Preferred Semester: I**

**Course Structure and Assessment Guidelines**

| 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** **Preferred Semester: II**

**Course Structure and Assessment Guidelines**

| 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_EEMC | GEXX/ HS06 | Any HSSM_EEMC course | As per course | 2 to 3 | As per course | | | |
| LLC_CC | GEXX* | Any LLC_CC course | Theory | 2 | 25 | - | 50 | 075 |
| HSSM_VEC | GEXX* | Any HSSM_VEC course | As per course | 2 to 3 | As per course | | | |
| **Total Credits** | | | | **18/ 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** **Preferred Semester: III**

**Course Structure and Assessment Guidelines**

| NEP-Vertical | Course | | Head of Learning | Credits | Assessment Guidelines (Marks) | | | Total marks (Passing@40% of total marks) |
|---|---|---|---|---|---|---|---|---|
| | Code | Name | | | ISA | MSE | ESE | |
| BSC | BS05 | 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 | GESB01 | Social Service Internship/ Project | Practical | 3 | 50 | - | 50 | 100 |
| MDM | MDXX* | Any MDM course | Theory | 2 | 15 | 20 | 40 | 075 |
| | | | Theory | 3 | As per course | | | 100 |
| HSSM_AEC | HS04 | Presentation Skills | Practical | 1 | 50 | - | - | 050 |
| **Total Credits** | | | | **21** | | | | |

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** **Preferred Semester: IV**

**Course Structure and Assessment Guidelines**

| NEP-Vertical | Course | | Head of Learning | Credits | Assessment Guidelines (Marks) | | | Total marks (Passing@40% of total marks) |
|---|---|---|---|---|---|---|---|---|
| | Code | Name | | | ISA | MSE | ESE | |
| BSC | BS12 | Engineering Mathematics-V | 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 |
| MDM | MDXX* | Any MDM course | Theory | 3 | As per course | | | |
| **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.

**Third Year B. Tech. Information Technology** **Preferred Semester: V**

**Course Structure and Assessment Guidelines**

| 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 | | | |
| **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.

**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** **Preferred Semester: VI**

**Course Structure and Assessment Guidelines**

| 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.

**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 | |
| IT30T | Probabilistic Graphical Model | Data Analytics |
| IT30P | 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** **Preferred Semester: VII**

**Course Structure and Assessment Guidelines**

| 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 |
| HSSM_IKS | GEXX* | Any HSSM_IKS course | As per course | 2 | As per course | | | |
| **Total Credits** | | | | **20** | | | | |

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

**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** **Preferred Semester: VIII**

**Course Structure and Assessment Guidelines**

| 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 Open Elective courses | Theory | 3 | 20 | 30 | 50 | 100 |
| | OEXX* | | Theory | 3 | 20 | 30 | 50 | 100 |
| | OEXX* | | 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 | HSXX* | Any HSSM course | As per course | 3 | As per course | | | |
| **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 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. Cyber Security (CS)
4. Internet of Things (IoT)

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 | IT21T | Artificial Intelligence |
| V | IT21P | Artificial Intelligence Lab |
| VI | IT25T | Soft Computing |
| VI | IT25P | Soft Computing Lab |
| VI | IT29T | Probabilistic Graphical Models |
| VI | IT29P | Probabilistic Graphical Models Lab |
| VII | IT33T | Data Analytics & Visualization |
| VII | IT33P | Data Analytics & Visualization Lab |
| VII | IT37T | Deep Learning |
| VII | IT37P | Deep Learning Lab |
| VII | IT41T | Natural language processing |
| VII | IT 41P | Natural language processing Lab |

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

| Semester | Course Code | Course Name |
|---|---|---|
| V | IT22T | Advanced Database Management |
| V | IT22P | Advanced Database Management Lab |
| VI | IT26T | Data and Feature Engineering |
| VI | IT26P | Data and Feature Engineering Lab |
| VI | IT30T | Probabilistic Graphical Models |
| VI | IT30P | Probabilistic Graphical Models Lab |
| VII | IT34T | Big Data Analytics |
| VII | IT34P | Big Data Analytics Lab |
| VII | IT38T | Recommendation Systems |
| VII | IT38P | Recommendation Systems Lab |
| VII | IT41T | Text, Web & Social Media Analytics |
| VII | IT41P | Text, Web & Social Media Analytic Lab |

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

| Semester | Course Code | Course Name |
|---|---|---|
| V | IT23T | Modern Sensors for IOT |
| V | IT23P | Modern Sensors for IOT Lab |
| VI | IT27T | Principles of IOT |
| VI | IT27P | Principles of IOT Lab |
| VI | IT31T | Embedded System Design with tiny OS |
| VI | IT31P | Embedded System Design with tiny OS Lab |
| VII | IT35T | IoT and Edge Computing |
| VII | IT35P | IoT and Edge Computing Lab |
| VII | IT39T | IoT Security and Trust |
| VII | IT39P | IoT Security and Trust Lab |
| VII | IT42T | Industrial IOT |
| VII | IT42P | Industrial IOT Lab |

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

| Semester | Course Code | Course Name |
|---|---|---|
| V | IT24T | Cryptography and Network Security |
| V | IT24P | Cryptography and Network Security Lab |
| VI | IT28T | System Security and Ethical Hacking |
| VI | IT28P | System Security and Ethical Hacking Lab |
| VI | IT32T | Digital Forensics |
| VI | IT32P | Digital Forensics Lab |
| VII | IT36T | Mobile and Wireless Security |
| VII | IT36P | Mobile and Wireless Security Lab |
| VII | IT40T | Web Application Security |
| VII | IT40P | Web Application Security Lab |
| VII | IT43T | Malware Analysis |
| VII | IT43P | Malware Analysis Lab |

## Appendix-B

### Guidelines for Award of Honours/ Minor Degree Programme

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

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

**For Honours Degree, learner shall select 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 |
| | 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 |
| **Total** | | | | | **18** | | | | |

**Honours Degree Programmes Offered.**

| Sr.No. | Honours Degree Programme | Department offering Honours |
|---|---|---|
| 1 | Artificial Intelligence and Machine Learning | Information Technology |
| 2 | Data Analytics | Information Technology |
| 3 | Cyber Security | Information Technology |
| 4 | Advance Internet of Things | Information Technology |

**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:**

- Department of Information Technology 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 Information Technology**

The Department of Information Technology offers the below listed Honours/Minor Degree Programme for learners of Information Technology.

**Honours Degree Programme Courses**

1. AIML
2. Data Analytics
3. Cyber Security
4. Advanced 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 | IT54T | Multimedia System |
| VI | IT54P | Multimedia System Lab |
| VII | IT58T | Game Architecture and Programming |
| VII | IT58P | Game Architecture and Programming Lab |
| VIII | IT62T | Augmented and Virtual Reality |
| VIII | IT62P | Augmented and Virtual Reality Lab |

**2. Data Analytics**

| Semester | Course Code | Course Name |
|---|---|---|
| VI | IT55T | Data Visualization Using R-Programming |
| VI | IT55P | Data Visualization Using R-Programming Lab |
| VII | IT59T | Deep Learning |
| VII | IT59P | Deep Learning Lab |
| VIII | IT63T | Adaptive Business Intelligence Systems |
| VIII | IT63P | Adaptive Business Intelligence Systems Lab |

**3. Cyber Security**

| Semester | Course Code | Course Name |
|---|---|---|
| VI | IT56T | IT Security Strategic Planning, Policy & Leadership |
| VI | IT56P | IT Security Strategic Planning, Policy & Leadership Lab |
| VII | IT60T | Hacker Techniques, Exploits & Incident handling |
| VII | IT60P | Hacker Techniques, Exploits & Incident handling Lab |
| VIII | IT64T | Advance Computer Forensic Analysis |
| VIII | IT64T | Advance Computer Forensic Analysis Lab |

**4. Advance IOT**

| Semester | Course Code | Course Name |
|---|---|---|
| VI | IT56T | Embedded Linux System |
| VI | IT56P | Embedded Linux System Lab |
| VII | IT60T | IOT & Data Analytics |
| VII | IT60P | IOT & Data Analytics Lab |

| | | |
|---|---|---|
| VIII | IT64T | IOT Applications & Web Development |
| VIII | IT64P | 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 |