



Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

Bachelor of Technology

in

Computer Engineering

Programme Structure

(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. Autonomy 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)**. 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 is in line with AICTE model curriculum.

The curriculum comprises courses from various categories like basic sciences, humanities and social sciences, engineering sciences, general education and branch specific courses including professional electives and open electives. The curriculum has core courses of branch of engineering positioned and sequenced to achieve sequential and integral learning of the entire breadth of the specific branch. These courses are completed by 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 curricula ensuring employability. Open Elective courses cover multi-disciplinary, special skill development, project management and similar knowledge that make learner capable to work in industrial environment.

For holistic development of learners, apart from technical courses, Humanities and Social Science courses develop the required soft-skills and attitude amongst learners. Our curriculum also introduces Social Service Internship and Internship with institutes abroad along with courses like Design Thinking, Wellness-Body, Mind & Spirit, Indian Traditional Knowledge System under General Education category. These general education courses aim to create balance in brain hemispheres and hence improve learners' clarity in thoughts and responses. In addition to this, the curriculum is augmented with Life Enrichment audit courses for knowledge inspiring experience.

Additionally, curriculum provides add-on minor/honours degree that involves field/ domain study. Learner can avail this degree by completing requirement of additional 15 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 Computer Engineering
Vidyalankar Institute of Technology

Chairman, Academic Council
Vidyalankar Institute of Technology

COMPETENCE BASED COURSE CATEGORY 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 | 16 |
| VII | Attitude | Humanities, Social Sciences and Management | 14 |
| VIII | | General Education | 16 |
| IX | | Life Enrichment | Audit |
| 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 Computer Engineering.

Additionally, learners can choose to avail Honours/ Minor Degree by completing requirements of 15 credits, which will be over and above the 161 credits required for B.Tech. degree.

Structure of Honours/ Minor Degree

| Sr. No. | Category | Credits |
|--------------|------------------------|-----------|
| 1 | Course Work | 9 |
| 2 | Industrial Interaction | 1 |
| 3 | Survey Report/ Paper | 1 |
| 4 | Seminar | 1 |
| 5 | Capstone Project | 3 |
| Total | | 15 |

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 |
|---------|-------------|-----------------------------|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | BS01 | Engineering Mathematics-I | 3 | - | - | 3 | 1 |
| 2 | BS14 | Physics | 2 | 2 | - | 3 | 1 |
| 3 | BS03 | Engineering Mathematics-II | 3 | - | - | 3 | 2 |
| 4 | BS05 | Engineering Mathematics-III | 3 | - | - | 3 | 3 |
| 5 | BS17 | Biology | 2 | - | - | 2 | 3 |
| 6 | BS19 | Chemistry | 2 | - | - | 2 | 3 |
| 7 | BS07 | Engineering Mathematics-IV | 3 | - | - | 3 | 4 |
| 8 | BS12 | Engineering Mathematics-V | 3 | - | - | 3 | 5 |

II. Engineering Science Courses

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|--|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | ES04 | Structured Programming | 2 | 2 | - | 3 | 1 |
| 2 | ES06 | Fundamentals of Computer Hardware and Networking | 2 | 2 | - | 3 | 1 |
| 3 | ES01 | Engineering Graphics | 2 | 2 | - | 3 | 2 |
| 4 | ES05 | Object Oriented Programming | 2 | 2 | - | 3 | 2 |
| 5 | ES07 | Fundamentals of Logic Circuits | 2 | 2 | - | 3 | 2 |

III. Core Courses

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|---|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | CE01 | Data Structure | 2 | 2 | - | 3 | 3 |
| 2 | CE02 | Microprocessor | 2 | 2 | - | 3 | 3 |
| 3 | CE03 | Digital Logic and Computer Organization | 2 | 2 | - | 3 | 3 |
| 4 | CE04 | Analysis of Algorithms | 2 | 2 | - | 3 | 4 |
| 5 | CE05 | Database Management Systems | 2 | 2 | - | 3 | 4 |
| 6 | CE06 | Computer Graphics | 2 | 2 | - | 3 | 4 |

Programme Structure (2022) for Bachelor of Technology (B.Tech.) – Computer Engineering

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|--|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 7 | CE07 | Operating Systems | 2 | 2 | - | 3 | 4 |
| 8 | CE08 | Software Lab | - | 4 | - | 2 | 4 |
| 9 | CE09 | Theory of Computational Science | 2 | - | 1 | 3 | 5 |
| 10 | CE10 | Artificial Intelligence and Machine Learning | 2 | 2 | - | 3 | 5 |
| 11 | CE11 | Computer Networks | 2 | 2 | - | 3 | 5 |
| 12 | CE12 | Software Engineering with WDL | 2 | 2 | - | 3 | 5 |
| 13 | CE13 | Digital Signal & Image Processing | 2 | 2 | - | 3 | 6 |
| 14 | CE14 | Cloud Computing | 2 | 2 | - | 3 | 6 |
| 15 | CE15 | System Programming and Compiler Design | 2 | 2 | - | 3 | 6 |
| 16 | CE16 | Distributed Systems | 2 | 2 | - | 3 | 6 |

IV. Professional Elective Courses

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|--|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | CE21 | Soft Computing | 2 | 2 | - | 3 | 5 |
| 2 | CE22 | Data warehousing and Data Mining | 2 | 2 | - | 3 | 5 |
| 3 | CE23 | Microcontroller interfacing and applications | 2 | 2 | - | 3 | 5 |
| 4 | CE24 | Cryptography | 2 | 2 | - | 3 | 5 |
| 5 | CE25 | Natural language processing | 2 | 2 | - | 3 | 6 |
| 6 | CE26 | Advance Databases | 2 | 2 | - | 3 | 6 |
| 7 | CE27 | Wireless Sensor Network | 2 | 2 | - | 3 | 6 |
| 8 | CE28 | System Security | 2 | 2 | - | 3 | 6 |
| 9 | CE29 | Advance Machine Learning | 2 | 2 | - | 3 | 6 |
| 10 | CE30 | Information Retrieval | 2 | 2 | - | 3 | 6 |
| 11 | CE31 | Embedded Systems | 2 | 2 | - | 3 | 6 |
| 12 | CE32 | Network Security | 2 | 2 | - | 3 | 6 |
| 13 | CE33 | Deep learning | 2 | 2 | - | 3 | 7 |
| 14 | CE34 | Big Data Analytics | 2 | 2 | - | 3 | 7 |
| 15 | CE35 | Mobile Computing | 2 | 2 | - | 3 | 7 |

Programme Structure (2022) for Bachelor of Technology (B.Tech.) – Computer Engineering

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|--|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 16 | CE36 | Enterprise Network Design | 2 | 2 | - | 3 | 7 |
| 17 | CE37 | Adaptive Business Intelligence Systems | 2 | 2 | - | 3 | 7 |
| 18 | CE38 | NoSQL | 2 | 2 | - | 3 | 7 |
| 19 | CE39 | Ubiquitous Computing | 2 | 2 | - | 3 | 7 |
| 20 | CE40 | Ethical Hacking + Social Engineering | 2 | 2 | - | 3 | 7 |
| 21 | CE41 | Management Information System | 2 | 2 | - | 3 | 7 |
| 22 | CE42 | IoT Architecture and Protocols | 2 | 2 | - | 3 | 7 |
| 23 | CE43 | Digital Forensic | 2 | 2 | - | 3 | 7 |

V. Open Elective Courses

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|------------------------------|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | OE01 | Cyber Law | 3 | - | - | 3 | 7 |
| 2 | OE02 | Project Management | 3 | - | - | 3 | 7 |
| 3 | OE03 | Product Lifecycle Management | 3 | - | - | 3 | 7 |
| 4 | OE04 | Sustainability Management | 3 | - | - | 3 | 7 |
| 5 | OE05 | Operation Research | 3 | - | - | 3 | 7 |
| 6 | OE06 | IPR and Patenting | 3 | - | - | 3 | 8 |
| 7 | OE07 | Research Methodology | 3 | - | - | 3 | 8 |
| 8 | OE08 | Renewable Energy Management | 3 | - | - | 3 | 8 |
| 9 | OE09 | Energy Audit and Management | 3 | - | - | 3 | 8 |
| 10 | OE10 | E-Farming | 3 | - | - | 3 | 8 |
| 11 | OE11 | Bioinformatics | 3 | - | - | 3 | 8 |
| 12 | OE12 | Nanotechnology | 3 | - | - | 3 | 8 |

VI. Project and Internship

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|---------------------|----------------|------------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | CE45 | Mini Project | - | 4 | - | 2 | 5 |
| 2 | CE46 | Industry Internship | - | 150(total) | - | 5 | TE Break |

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|----------------------|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 3 | CE47 | Project-1 (Synopsis) | 3 | - | - | 3 | 7 |
| 4 | CE48 | Project-2 (Final) | 1 | 6 | - | 4 | 8 |
| 5 | CE49 | Publication | 2 | - | - | 2 | 8 |

VII. Humanities, Social Sciences and Management Courses

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|--|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | HS01 | Effective Communication | 2 | 2 | - | 3 | 1 |
| 2 | HS05 | E-Waste and Environmental Management | 2 | - | - | 2 | 1 |
| 3 | HS02 | Professional Skills | 2 | 2 | - | 3 | 2 |
| 4 | HS03 | Technical and Business Writing | - | 4* | - | 2 | 3 |
| 5 | HS06 | Principles of Economics and Management | 2 | - | 1 | 3 | 4 |
| 6 | HS04 | Presentation Skills | - | 2 | - | 1 | 5 |

*2 hrs practical class-wise + 2 hrs of practical batch-wise

VIII. General Education

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|--|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | GE01 | Design Thinking | 2 | - | 1 | 3 | 2 |
| 2 | GE02 | Social Service Internship/ Project | - | 6 | - | 3 | 3 |
| 3 | GE03 | Internship with other Institutes (Credit Transfer) | 2 | 4 | - | 4 | SE Break |
| 4 | GE04 | Wellness – Body, Mind & Spirit | 1 | 2 | - | 2 | Any |
| 5 | GE05 | Basics of Finance & Legal aspects for Business | 2 | - | - | 2 | Any |
| 6 | GE06 | Indian Constitution | 2 | - | - | 2 | Any |
| 7 | GE07 | Universal Human Values | 2 | - | - | 2 | Any |
| 8 | GE08 | Indian Traditional Knowledge System | 2 | - | - | 2 | Any |

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|---------------------------------|----------------|-----------|----------|---------|--------------------|
| | | | Lecture | Practical | Tutorial | | |
| 9 | GE09 | Corporate and social etiquettes | 2 | - | - | 2 | Any |
| 10 | GE10 | Global Citizenship Education | 2 | - | - | 2 | Any |

IX. Life Enrichment Courses

| Sr. No. | Course Code | Course Title | Hours Per Week (Lecture/ Practical/ Tutorial) | Credits | Preferred Semester |
|---------|-------------|--|---|---------|--------------------|
| 1 | LE01 | Photography | 2 | - | - |
| 2 | LE02 | Indian Folk Dances | 2 | - | - |
| 3 | LE03 | Understanding Indian Classical Music | 2 | - | - |
| 4 | LE04 | Wildlife and Conservation | 2 | - | - |
| 5 | LE05 | Indian ancient education system | 2 | - | - |
| 6 | LE06 | Indian sports | 2 | - | - |
| 7 | LE07 | Indian ancient medicinal therapies: Ayurveda | 2 | - | - |
| 8 | LE08 | Indian Post: Connecting people | 2 | - | - |
| 9 | LE09 | Great entrepreneurs | 2 | - | - |
| 10 | LE10 | Success stories of Indian space mission | 2 | - | - |
| 11 | LE11 | Weather and environment | 2 | - | - |
| 12 | LE12 | Unconventional energy | 2 | - | - |

Honours/ Minor Degree Courses

| Sr. No. | Course Code | Course Title | Hours Per Week | | | Credits | Preferred Semester |
|---------|-------------|--------------------------------------|----------------|-----------|----------|---------|------------------------|
| | | | Lecture | Practical | Tutorial | | |
| 1 | CE50 | Industry Interaction | 15 (total) | - | - | 1 | Break of Sem5 and Sem6 |
| 2 | CE54 | Multimedia System | 2 | 2 | - | 3 | 6 |
| 3 | CE51 | Survey Report/ Paper | 15 (total) | - | - | 1 | Break of Sem6 and Sem7 |
| 4 | CE55 | Game Architecture and Programming | 2 | 2 | - | 3 | 7 |
| 5 | CE56 | Digital Payments | 2 | 2 | - | 3 | 7 |
| 6 | CE52 | Seminar | 15 (total) | - | - | 1 | Break of Sem7 and Sem8 |
| 7 | CE53 | Capstone Project | - | 6 | - | 3 | 8 |
| 8 | CE57 | Augmented and Virtual Reality | 2 | 2 | - | 3 | 8 |
| 9 | CE58 | Text, Web and Social Media Analytics | 2 | 2 | - | 3 | 8 |
| 10 | CE59 | Data Visualization | 2 | 2 | - | 3 | 8 |
| 11 | CE60 | Data Center Management | 2 | 2 | - | 3 | 8 |
| 12 | CE61 | Intrusion Prevention System | 2 | 2 | - | 3 | 8 |
| 13 | CE62 | Blockchain Technology | 2 | 2 | - | 3 | 8 |

Course Structure and Evaluation Scheme
for
Bachelor of Technology
in
Computer Engineering

**First Year B. Tech. Computer Engineering
Course Structure and Evaluation Scheme**

Semester: I

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|--|------------------|-----------|---------------------------|-----|-----|--|
| | Code | Nature | Name | | | ISA | MSE | ESE | |
| 1 | HS01 | C | Effective Communication | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Effective Communication | Practical | 1 | 25 | - | 25 | 050 |
| 2 | HS05 | C | E-Waste and Environmental Management | Theory | 2 | 15 | 20 | 40 | 075 |
| 3 | BS14 | C | Physics | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Physics | Practical | 1 | 25 | - | 25 | 050 |
| 4 | BS01 | C | Engineering Mathematics-I | Theory | 3 | 20 | 30 | 50 | 100 |
| 5 | ES06 | C | Fundamentals of Computer Hardware and Networking | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Fundamentals of Computer Hardware and Networking | Practical | 1 | 25 | - | 25 | 050 |
| 6 | ES04 | C | Structured Programming | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Structured Programming | Practical | 1 | 25 | - | 25 | 050 |
| 7 | GEXX | E | Any GE course from GE04 onwards | As per course | 2 | 25 | - | 50 | 075 |
| Total Credits | | | | | 19 | - | - | - | - |

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESE= End Semester Examination
C=Compulsory, T=Tandem, E=Elective, A=Audit

**First Year B. Tech. Computer Engineering
Course Structure and Evaluation Scheme**

Semester: II

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|---------------------------------|------------------|-----------|---------------------------|-----|-----|--|
| | Code | Nature | Name | | | ISA | MSE | ESE | |
| 1 | HS02 | C | Professional Skills | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Professional Skills | Practical | 1 | 25 | - | 25 | 050 |
| 2 | BS03 | C | Engineering Mathematics-II | Theory | 3 | 20 | 30 | 50 | 100 |
| 3 | ES01 | C | Engineering Graphics | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Engineering Graphics | Practical | 1 | 25 | - | 25 | 050 |
| 4 | ES07 | C | Fundamental of Logic Circuits | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Fundamental of Logic Circuits | Practical | 1 | 25 | - | 25 | 050 |
| 5 | ES05 | C | Object-Oriented Programming | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Object-Oriented Programming | Practical | 1 | 25 | - | 25 | 050 |
| 6 | GE01 | C | Design Thinking | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Design Thinking | Tutorial | 1 | 50 | - | - | 050 |
| 7 | GEXX | E | Any GE course from GE04 onwards | As per course | 2 | 25 | - | 50 | 075 |
| Total Credits | | | | | 20 | - | - | - | - |

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Second Year B. Tech. Computer Engineering
Course Structure and Evaluation Scheme

Semester: III

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|---|------------------|-----------|---------------------------|-----|-----|--|
| | Code | Nature | Name | | | ISA | MSE | ESE | |
| 1 | HS03 | C | Technical and Business Writing | Practical | 2 | 50 | - | - | 050 |
| 2 | BS05 | C | Engineering Mathematics-III | Theory | 3 | 20 | 30 | 50 | 100 |
| 3 | BSXX | E | Basic Science Elective | Theory | 2 | 15 | 20 | 40 | 075 |
| 4 | CE01 | C | Data Structure | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Data Structure | Practical | 1 | 25 | - | 25 | 050 |
| 5 | CE02 | C | Microprocessor | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Microprocessor | Practical | 1 | 25 | - | 25 | 050 |
| 6 | CE03 | C | Digital Logic and Computer Organization | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Digital Logic and Computer Organization | Practical | 1 | 25 | - | 25 | 050 |
| 7 | GE02 | C | Social Service Internship/ Project | Practical | 3# | 75 | - | - | 075 |
| 8 | GEXX | E | Any GE course from GE04 onwards | As per course | 2 | 25 | - | 50 | 075 |
| Total Credits | | | | | 21 | - | - | - | - |

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 C=Compulsory, T=Tandem, E=Elective, A=Audit

#For 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).

Basic Science Elective Courses (BSXX)

| Course Code | Course Name |
|-------------|-------------|
| BS17 | Biology |
| BS19 | Chemistry |

Second Year B. Tech. Computer Engineering
Course Structure and Evaluation Scheme

Semester: IV

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|--|------------------|-----------|---------------------------|-----|-----|--|
| | Code | Nature | Name | | | ISA | MSE | ESE | |
| 1 | HS06 | C | Principles of Economics and Management | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Principles of Economics and Management | Tutorial | 1 | 50 | - | - | 050 |
| 2 | BS07 | C | Engineering Mathematics-IV | Theory | 3 | 20 | 30 | 50 | 100 |
| 3 | CE04 | C | Analysis of Algorithms | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Analysis of Algorithms | Practical | 1 | 25 | - | 25 | 050 |
| 4 | CE05 | C | Database Management Systems | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Database Management Systems | Practical | 1 | 25 | - | 25 | 050 |
| 5 | CE06 | C | Computer Graphics | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Computer Graphics | Practical | 1 | 25 | - | 25 | 050 |
| 6 | CE07 | C | Operating Systems | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Operating Systems | Practical | 1 | 25 | - | 25 | 050 |
| 7 | CE08 | C | Software Lab | Practical | 2 | 25 | - | 25 | 050 |
| Total Credits | | | | | 20 | - | - | - | - |

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Second Year B. Tech. Computer Engineering - Summer Break

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|--|------------------|----------|---------------------------|----------|--|
| | Code | Nature | Name | | | Internal | External | |
| 1 | GE03 | C | Internship with other Institutes (Credit Transfer) | Theory | 2 | 25 | 25 | 050 |
| | | T | Internship with other Institutes (Credit Transfer) | Practical | 2 | 25 | 25 | 050 |
| Total Credits | | | | | 4 | - | - | - |

**Third Year B. Tech. Computer Engineering
Course Structure and Evaluation Scheme**

Semester: V

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40 % of total marks) |
|----------------------|--------|--------|--|------------------|-----------|---------------------------|-----|-----|---|
| | Code | Nature | Name | | | ISA | MSE | ESE | |
| 1 | HS04 | C | Presentation Skills | Theory | 1 | 25 | - | - | 025 |
| 2 | BS12 | C | Engineering Mathematics-V | Theory | 3 | 20 | 30 | 50 | 100 |
| 3 | CE09 | C | Theory of Computer Science | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Theory of Computer Science | Tutorial | 1 | 50 | - | - | 050 |
| 4 | CE10 | C | Artificial Intelligence and Machine Learning | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Artificial Intelligence and Machine Learning | Practical | 1 | 25 | - | 25 | 050 |
| 5 | CE11 | C | Computer Networks | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Computer Networks | Practical | 1 | 25 | - | 25 | 050 |
| 6 | CE12 | C | Software Engineering | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Web Design Lab | Practical | 1 | 25 | - | 25 | 050 |
| 7 | CEXX | E | Professional Elective-1 | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Professional Elective-1 | Practical | 1 | 25 | - | 25 | 050 |
| 8 | CE45 | C | Mini-Project | Practical | 2 | 25 | - | 50 | 075 |
| Total Credits | | | | | 21 | - | - | - | - |

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C=Compulsory, T=Tandem, E=Elective, A=Audit

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 (CEXX)

| Course Code | Course Name | Specialization Track Name# |
|-------------|--|---|
| CE21 | Soft Computing | Artificial Intelligence and Machine Learning (AIML) |
| CE22 | Data Warehousing and Data Mining | Data Science (DS) |
| CE23 | Microcontroller Interfacing and Applications | Internet of Things (IoT) |
| CE24 | Cryptography | Computer Security (CSec) |

#For details of Specialization Certificate, refer Appendix-A

Guidelines for Award of Honours/ Minor Degree – Refer Appendix-B

Important Note 2: Before the end of Semester 5, learners are required to go through the Appendix-B carefully to opt for Honours/ Minor Degree Programme. The Honours/ Minor degree programme will span from the end of semester 5 to the end of Semester 8. Learners willing to opt for Honours/ Minor degree programme are required to satisfactorily complete the course titled "Industry Interaction" of 1 credit during the break of the semester 5 and semester 6 which will facilitate them to select Honours/ Minor degree programme of their choice. Detailed guidelines regarding the Honours/ Minor degree programmes of all the departments, Eligibility criterion and Credit requirements are given in Appendix-B. Courses relevant to Honours/ Minor Degree Programmes offered by Department of Computer Engineering are given in Appendix-C.

**Third Year B. Tech. Computer Engineering
Course Structure and Evaluation Scheme**

Semester: VI

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|--|------------------|-----------|---------------------------|-----|-----|--|
| | Code | Nature | Name | | | ISA | MSE | ESE | |
| 1 | CE13 | C | Digital Signal and Image Processing | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Digital Signal and Image Processing | Practical | 1 | 25 | - | 25 | 050 |
| 2 | CE14 | C | Cloud Computing | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Cloud Computing | Practical | 1 | 25 | - | 25 | 050 |
| 3 | CE15 | C | System Programming and Compiler Design | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | System Programming and Compiler Design | Practical | 1 | 25 | - | 25 | 050 |
| 4 | CE16 | C | Distributed Systems | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Distributed Systems | Practical | 1 | 25 | - | 25 | 050 |
| 5 | CEXX | E | Professional Elective-2 | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Professional Elective-2 | Practical | 1 | 25 | - | 25 | 050 |
| 6 | CEXX | E | Professional Elective-3 | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Professional Elective-3 | Practical | 1 | 25 | - | 25 | 050 |
| Total Credits | | | | | 18 | - | - | - | - |

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
C=Compulsory, T=Tandem, E=Elective, A=Audit

Professional Elective-2 Courses (CEXX)

| Course Code | Course Name | Specialization Track Name# |
|-------------|-----------------------------|---|
| CE25 | Natural Language Processing | Artificial Intelligence and Machine Learning (AIML) |
| CE26 | Advance Databases | Data Science (DS) |
| CE27 | Wireless Sensor Network | Internet of Things (IoT) |
| CE28 | System Security | Computer Security (CSec) |

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-3 Courses (CEXX)

| Course Code | Course Name | Specialization Track Name# |
|-------------|--------------------------|---|
| CE29 | Advance Machine Learning | Artificial Intelligence and Machine Learning (AIML) |
| CE30 | Information Retrieval | Data Science (DS) |
| CE31 | Embedded Systems | Internet of Things (IoT) |
| CE32 | Network Security | Computer Security (CSec) |

#For details of Specialization Certificate, refer Appendix-A

Third Year B. Tech. Computer Engineering - Summer Break

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|---------------------|------------------|----------|---------------------------|----------|--|
| | Code | Nature | Name | | | Internal | External | |
| 1 | CE46 | C | Industry Internship | Practical | 5 | 50 | 75 | 125 |
| Total Credits | | | | | 5 | - | - | - |

**Final Year B. Tech. Computer Engineering
Course Structure and Evaluation Scheme**

Semester: VII

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|--------------------------|------------------|-----------|---------------------------|-----|-----|--|
| | Code | Nature | Name | | | ISA | MSE | ESE | |
| 1 | CEXX | E | Professional Elective-4 | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Professional Elective-4 | Practical | 1 | 25 | - | 25 | 050 |
| 2 | CEXX | E | Professional Elective-5 | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Professional Elective-5 | Practical | 1 | 25 | - | 25 | 050 |
| 3 | CEXX | E | Professional Elective-6 | Theory | 2 | 15 | 20 | 40 | 075 |
| | | T | Professional Elective-6 | Practical | 1 | 25 | - | 25 | 050 |
| 4 | OEXX | E | Any two from the offered | Theory | 3 | 20 | 30 | 50 | 100 |
| 5 | OEXX | E | Open Elective courses | Theory | 3 | 20 | 30 | 50 | 100 |
| 6 | CE47 | C | Project-1 (Synopsis) | Theory | 3 | 50 | - | 50 | 100 |
| Total Credits | | | | | 18 | - | - | - | - |

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
C=Compulsory, T=Tandem, E=Elective, A=Audit

Professional Elective-4 Courses (CEXX)

| Course Code | Course Name | Specialization Track Name# |
|-------------|---------------------------|---|
| CE33 | Deep learning | Artificial Intelligence and Machine Learning (AIML) |
| CE34 | Big Data Analytics | Data Science (DS) |
| CE35 | Mobile Computing | Internet of Things (IoT) |
| CE36 | Enterprise Network Design | Computer Security (CSec) |

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-5 Courses (CEXX)

| Course Code | Course Name | Specialization Track Name# |
|-------------|--|---|
| CE37 | Adaptive Business Intelligence Systems | Artificial Intelligence and Machine Learning (AIML) |
| CE38 | NoSQL | Data Science (DS) |
| CE39 | Ubiquitous Computing | Internet of Things (IoT) |
| CE40 | Ethical Hacking + Social Engineering | Computer Security (CSec) |

#For details of Specialization Certificate, refer Appendix-A

Professional Elective-6 Courses (CEXX)

| Course Code | Course Name | Specialization Track Name# |
|-------------|--------------------------------|---|
| CE41 | Management Information System | Artificial Intelligence and Machine Learning (AIML) |
| CE41 | Management Information System | Data Science (DS) |
| CE42 | IoT Architecture and Protocols | Internet of Things (IoT) |
| CE43 | Digital Forensic | Computer Security (CSec) |

#For details of Specialization Certificate, refer Appendix-A

**Final Year B. Tech. Computer Engineering
Course Structure and Evaluation Scheme**

Semester: VIII

| Sr. No. | Course | | | Head of Learning | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40% of total marks) |
|----------------------|--------|--------|--|------------------|-----------|---------------------------|-----|-----|--|
| | Code | Nature | Name | | | ISA | MSE | ESE | |
| 1 | OEXX | E | Any three from the offered Open Elective courses | Theory | 3 | 20 | 30 | 50 | 100 |
| 2 | OEXX | E | | Theory | 3 | 20 | 30 | 50 | 100 |
| 3 | OEXX | E | | Theory | 3 | 20 | 30 | 50 | 100 |
| 4 | CE48 | C | Project-2 (Final) | Theory | 1 | 25 | - | - | 025 |
| | | T | Project-2 (Final) | Practical | 3 | 50 | - | 50 | 100 |
| 5 | CE49 | C | Publication | Theory | 2 | 25 | - | 50 | 075 |
| Total Credits | | | | | 15 | - | - | - | - |

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination
C=Compulsory, T=Tandem, E=Elective, A=Audit

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 (1 course in Semester 5, 2 courses in Semester 6 and 3 courses in Semester 7) as a part of 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 Science (DS)
3. Internet of Things (IoT)
4. Computer Security (CSec)

From semester 5 to semester 7, 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 7, 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 7 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 Machine Learning

| Semester | Course Code | Course Name |
|----------|-------------|--|
| V | CE21 | Soft Computing |
| VI | CE25 | Natural Language Processing |
| VI | CE29 | Advance Machine Learning |
| VII | CE33 | Deep learning |
| VII | CE37 | Adaptive Business Intelligence Systems |
| VII | CE41 | Management Information System |

DS track: Courses to be chosen for specialization in Data Science

| Semester | Course Code | Course Name |
|----------|-------------|----------------------------------|
| V | CE22 | Data Warehousing and Data Mining |
| VI | CE26 | Advance Databases |
| VI | CE30 | Information Retrieval |
| VII | CE34 | Big Data Analytics |
| VII | CE38 | NoSQL |
| VII | CE41 | Management Information System |

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

| Semester | Course Code | Course Name |
|----------|-------------|--|
| V | CE23 | Microcontroller Interfacing and Applications |
| VI | CE27 | Wireless Sensor Network |
| VI | CE31 | Embedded Systems |
| VII | CE35 | Mobile Computing |
| VII | CE39 | Ubiquitous Computing |
| VII | CE42 | IoT Architecture and Protocols |

CSec track: Courses to be chosen for specialization in Computer Security

| Semester | Course Code | Course Name |
|----------|-------------|--------------------------------------|
| V | CE24 | Cryptography |
| VI | CE28 | System Security |
| VI | CE32 | Network Security |
| VII | CE36 | Enterprise Network Design |
| VII | CE40 | Ethical Hacking + Social Engineering |
| VII | CE43 | Digital Forensic |

Appendix-B

Guidelines for Award of Honours/ Minor Degree Programme

Honours and Minor Degree programme is introduced 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 15 credits, which will be over and above the credits required for B.Tech. degree. 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 Honour programme offered by his/her own department. Alternatively, for Minor degree, learner shall select Honour programme offered by any other department.

Eligibility Criteria

- Learners should have no backlog in Semester 1,2,3 and 4.
- The CGPI (based on Semester 1,2,3 and 4) of the learner must be 6.75 and above.
- Learner can opt for only one Honours/ Minor degree programme.
- Learners cannot opt for those Honours/ Minor degree programmes which include courses that he/she has chosen under Professional Elective Courses and /or under any other Category of courses.
- Honours/ Minor degree programme can only be opted by a learner during their regular engineering studies.
- Learner must complete the Honours/ Minor degree programme in the stipulated time of 3 semesters only i.e. from end of Semester 5 to end of Semester 8.

Syllabus Scheme Template

| Sr. No. | Course | | | Head of Learning | Sem | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40 % of total marks) |
|---------|--------|--------|----------------------|------------------|--------------------------|---------|---------------------------|-----|-----|---|
| | Code | Nature | Name | | | | ISA | MSE | ESE | |
| 1 | XXXX | C | Industry Interaction | Theory | Break of Sem 5 and Sem 6 | 1 | 25 | - | - | 025 |
| 2 | XXXX | E | Honours / Minor | Theory | 6 | 2 | 15 | 20 | 40 | 075 |

Programme Structure (2022) for Bachelor of Technology (B.Tech.) – Computer Engineering

| Sr. No. | Course | | | Head of Learning | Sem | Credits | Evaluation scheme (Marks) | | | Total marks (Passing@40 % of total marks) |
|----------------------|--------|--------|---------------------------------|------------------|--------------------------|-----------|---------------------------|-----|-----|---|
| | Code | Nature | Name | | | | ISA | MSE | ESE | |
| | | | Degree Course 1 | | | | | | | |
| | | T | Honours / Minor Degree Course 1 | Practical | 6 | 1 | 25 | - | 25 | 050 |
| 3 | XXXX | C | Survey Report/ Paper | Theory | Break of Sem 6 and Sem 7 | 1 | 25 | - | - | 025 |
| 4 | XXXX | E | Honours / Minor Degree Course 2 | Theory | 7 | 2 | 15 | 20 | 40 | 075 |
| | | T | Honours / Minor Degree Course 2 | Practical | 7 | 1 | 25 | - | 25 | 050 |
| 5 | XXXX | C | Seminar | Theory | Break of Sem 7 and Sem 8 | 1 | 25 | - | - | 025 |
| 6 | XXXX | E | Honours / Minor Degree Course 3 | Theory | 8 | 2 | 15 | 20 | 40 | 075 |
| | | T | Honours / Minor Degree Course 3 | Practical | 8 | 1 | 25 | - | 25 | 050 |
| 7 | XXXX | C | Capstone Project | Practical | 8 | 3 | 50 | - | 50 | 100 |
| Total Credits | | | | | | 15 | - | - | - | - |

Honours/ Minor Degree Programmes offered by all departments

| Sr. No. | Honours/ Minor Degree Programme | Department offering Honours | Department offering Minor |
|---------|---|-----------------------------|---|
| 1 | Data Analytics | Information Technology | <ul style="list-style-type: none"> • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 2 | Social Media Insights | Information Technology | <ul style="list-style-type: none"> • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 3 | Advanced IoT | Information Technology | <ul style="list-style-type: none"> • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 4 | Advanced Cyber Security | Information Technology | <ul style="list-style-type: none"> • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 5 | Intelligent Game Development | Computer Engineering | <ul style="list-style-type: none"> • Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 6 | Data Science and Machine Learning | Computer Engineering | <ul style="list-style-type: none"> • Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 7 | Artificial Intelligence and Data Analysis | Computer Engineering | <ul style="list-style-type: none"> • Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 8 | Data Science and Forecasting | Computer Engineering | <ul style="list-style-type: none"> • Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 9 | Smart City Management | Computer Engineering | <ul style="list-style-type: none"> • Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 10 | Cyber Forensic and Penetration | Computer Engineering | <ul style="list-style-type: none"> • Information Technology • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 11 | Crypto Currency | Computer Engineering | <ul style="list-style-type: none"> • Information Technology |

Programme Structure (2022) for Bachelor of Technology (B.Tech.) – Computer Engineering

| Sr. No. | Honours/ Minor Degree Programme | Department offering Honours | Department offering Minor |
|----------------|--|------------------------------------|---|
| | | | <ul style="list-style-type: none"> • Electronics and Computer Science • Electronics and Telecommunication • Biomedical |
| 12 | Intelligent Game Development | Electronics and Computer Science | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Telecommunication • Biomedical |
| 13 | Data Engineering | Electronics and Computer Science | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Telecommunication • Biomedical |
| 14 | Smart City-Design and Development | Electronics and Computer Science | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Telecommunication • Biomedical |
| 15 | Electronic Product Development | Electronics and Computer Science | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Telecommunication • Biomedical |
| 16 | Advanced Embedded System | Electronics and Telecommunication | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical |
| 17 | Intelligent Game Development | Electronics and Telecommunication | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical |
| 18 | Sentiment Analytics and Data Forecasting | Electronics and Telecommunication | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical |
| 19 | Advanced Communication Technology | Electronics and Telecommunication | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical |
| 20 | Advanced VLSI Technology | Electronics and Telecommunication | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Computer Science • Biomedical |
| 21 | AI in Healthcare | Biomedical | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Computer Science |

| Sr. No. | Honours/ Minor Degree Programme | Department offering Honours | Department offering Minor |
|---------|---------------------------------|-----------------------------|---|
| | | | <ul style="list-style-type: none"> • Electronics and Telecommunication |
| 22 | Medical IoT | Biomedical | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication |
| 23 | Medical Imaging Technology | Biomedical | <ul style="list-style-type: none"> • Information Technology • Computer Engineering • Electronics and Computer Science • Electronics and Telecommunication |

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

- Computer Department Learners can refer to the list of Honours Degree Programme and their corresponding courses in the Appendix-C.
- Learners of Computer Department who wish to opt for Minor Degree Programme offered by other department can obtain details of these programmes from Appendix-C of the respective department.

Appendix-C

Honours/ Minor Degree Programmes offered by Department of Computer Engineering

Department of Computer Engineering offers the below listed Honours degree programme for learners of Computer Engineering, these programs can be availed as Minor degree programme by learners of other departments.

1. Intelligent Game Development
2. Data Science and Machine Learning
3. Artificial Intelligence and Data Analysis
4. Data Science and Forecasting
5. Smart City Management
6. Cyber Forensic and Penetration
7. Crypto Currency

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

1. Intelligent Game Development

| Semester | Course Code | Course Name |
|----------|-------------|-----------------------------------|
| VI | CE54 | Multimedia System |
| VII | CE55 | Game Architecture and Programming |
| VIII | CE57 | Augmented and Virtual Reality |

2. Data Science and Machine Learning

| Semester | Course Code | Course Name |
|----------|-------------|--------------------------------------|
| VI | CE30 | Information Retrieval |
| VII | CE38 | NoSQL |
| VIII | CE58 | Text, Web and Social Media Analytics |

3. Artificial Intelligence and Data Analysis

| Semester | Course Code | Course Name |
|----------|-------------|--------------------------------------|
| VI | CE25 | Natural Language Processing |
| VII | CE33 | Deep Learning |
| VIII | CE58 | Text, Web and Social Media Analytics |

4. Data Science and Forecasting

| Semester | Course Code | Course Name |
|----------|-------------|--|
| VI | CE29 | Advance Machine Learning |
| VII | CE37 | Adaptive Business Intelligence Systems |
| VIII | CE59 | Data Visualization |

5. Smart City Management

| Semester | Course Code | Course Name |
|----------|-------------|------------------------|
| VI | CE32 | Network Security |
| VII | CE34 | Big Data Analytics |
| VIII | CE60 | Data Centre Management |

6. Cyber Forensic and Penetration

| Semester | Course Code | Course Name |
|----------|-------------|-----------------------------|
| VI | CE27 | Wireless Sensor Network |
| VII | CE34 | Big Data Analytics |
| VIII | CE61 | Intrusion Prevention System |

7. Crypto Currency

| Semester | Course Code | Course Name |
|----------|-------------|-----------------------|
| VI | CE26 | Advance Databases |
| VII | CE56 | Digital Payments |
| VIII | CE62 | Blockchain Technology |

(Draft copy of Programme Scheme (R-2022), Subject to approval of Academic Council, Vidyalankar Institute of Technology)