



SSN School of Engineering

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**Bachelor of Technology
Computer Science and Engineering**

CURRICULUM

REGULATIONS 2026

VISION AND MISSION OF THE DEPARTMENT

VISION

To become a world-class centre of excellence in computer science and engineering, fostering innovation, research, and academic excellence to develop competent and socially responsible leaders.

MISSION

1. To impart quality education that blends strong theoretical foundations with practical exposure by continuously evolving the curriculum and pedagogy in line with emerging technologies
2. To foster a culture of research, innovation, and entrepreneurship through collaboration with industries, research organizations, and academic institutions.
3. To equip graduates to be globally competent professionals with analytical skills and a commitment to ethical and sustainable computing practices.
4. To develop socially responsible leaders capable of transforming ideas into impactful real-world solutions.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- PEO1 Professional and Entrepreneurial Excellence:** Our graduates will excel as competent professionals or entrepreneurs by applying technical knowledge, analytical skills, and modern tools to develop innovative and sustainable solutions.
- PEO2 Lifelong Learning and Research:** Our graduates will engage in lifelong learning, research, and innovation to enhance their expertise and adapt to emerging technologies and global trends.
- PEO3 Ethical Leadership and Social Responsibility:** Our graduates will demonstrate leadership, ethical conduct, teamwork, and social responsibility while addressing real-world challenges.

PROGRAM OUTCOMES (POs)

Program outcomes are the skills and knowledge which the students should have acquired at the time of graduation. A program outcome indicates what a student can do from course-wise knowledge acquired during the program. Students who graduate from this program shall exhibit the following:

| PO | Graduate Attribute | Programme Outcome |
|----|-----------------------|--|
| 1 | Engineering Knowledge | Apply the knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization to develop to the solution of complex Engineering problems (WK 1 to 4). |
| 2 | Problem Analysis | Identify, formulate, review research literature, and analyze complex Engineering problems reaching substantiated conclusions with |

| | | |
|----|--|--|
| | | consideration for sustained development (WK 1 to 4). |
| 3 | Design/Development of solutions | Design creative solutions for complex Engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required (WK5). |
| 4 | Conduct Investigations of Complex Problems | Conduct investigations of complex Engineering problems using research-based knowledge including design of experiments, modelling, analysis and interpretation of data to provide valid conclusions (WK8). |
| 5 | Engineering Tool Usage: | Create, select, and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling, recognizing their limitations to solve complex Engineering problems (WK2 and WK6). |
| 6 | The Engineer and The World | Analyze and evaluate societal and environmental aspects while solving complex Engineering problems for their impact on sustainability with reference to economy, health, safety, legal framework, culture and environment (WK1, WK5 and WK7). |
| 7 | Ethics | Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws (WK9). |
| 8 | Individual and Collaborative Teamwork. | Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams. |
| 9 | Communication | Communicate effectively and inclusively within the engineering community and the society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences. |
| 10 | Project Management and Finance | Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's |

| | | |
|----|--------------------|--|
| | | own work, as a member and leader in a team, and to manage projects and in multi-disciplinary environments. |
| 11 | Life-long learning | Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change (WK8). |

PROGRAM SPECIFIC OBJECTIVES (PSOs)

| | |
|-------------|---|
| PSO1 | Solve computing problems by leveraging knowledge in foundational principles, algorithms, and engineering to design, develop, and maintain efficient, scalable, reliable, and secure software systems. |
| PSO2 | Apply techniques of data science, artificial intelligence, machine learning, immersive technologies, and quantum computing to solve real-world problems. |

PEO - PO/PSO Mapping

| PEO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| PEO1 | 3 | 3 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 3 | 2 | 3 | 3 |
| PEO2 | 2 | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| PEO3 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 2 |

Mapping Programme Outcomes with Graduate Attributes

| Programme Outcomes | NBA's GAs |
|--|------------|
| PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop the solution of complex engineering problems. | GA1 |
| PO2: Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4). | GA2 |

| | |
|--|-------------|
| PO3: Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/ processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society, and environment as required. (WK5). | GA3 |
| PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8). | GA4 |
| PO5: Engineering Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6). | GA5 |
| PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture, and environment. (WK1, WK5, and WK7). | GA10 |
| PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity, and inclusion; adhere to national & international laws. (WK9). | GA10 |
| PO8: Individual and Collaborative Teamwork: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams | GA6 |
| PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences. | GA8 |
| PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments. | GA7 |

| | |
|---|-----------------|
| PO11: Life-Long Learning: Recognize the need for and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8). | GA9, G11 |
|---|-----------------|

| Washington Accord Knowledge Levels (WK) | Attributes |
|--|---|
| WK1 | Natural sciences and social sciences |
| WK2 | Conceptually based mathematics |
| WK3 | Engineering fundamentals |
| WK4 | Engineering specialist knowledge |
| WK5 | Engineering design and operations |
| WK6 | Engineering Practice (Technology) |
| WK7 | Engineering knowledge in society, public safety and sustainable development |
| WK8 | Research based knowledge |
| WK9 | Professional ethics, inclusive behaviour and conduct |

| Complex Engineering Problems (WP) | Attributes |
|--|-----------------------------------|
| WP1 | Depth of knowledge required |
| WP2 | Range of conflicting requirements |
| WP3 | Depth of analysis required |
| WP4 | Familiarity of issues |
| WP5 | Extent of applicable codes |

| | |
|-----|--|
| WP6 | Extent of stakeholder involvement and conflicting requirements |
| WP7 | Interdependence |

| Complex Engineering Activities (EA) | Attributes |
|--|---|
| EA1 | Range of resources |
| EA2 | Level of interactions |
| EA3 | Innovation |
| EA4 | Consequences to the society and environment |
| EA5 | Familiarity |

| Sustainable Development Goals (SDG) | Details | Sustainable Development Goals (SDG) | Details |
|--|---|--|--|
| SDG 1 | No poverty | SDG 10 | Reducing inequality |
| SDG 2 | Zero hunger | SDG 11 | Sustainable cities and communities |
| SDG 3 | Good health and well-being | SDG 12 | Responsible consumption and production |
| SDG 4 | Quality education | SDG 13 | Climate action |
| SDG 5 | Gender equality | SDG 14 | Life below water |
| SDG 6 | Clean water and sanitation | SDG 15 | Life on land |
| SDG 7 | Affordable and clean energy | SDG 16 | Peace, justice and strong institutions |
| SDG 8 | Decent work and economic growth | SDG 17 | Partnerships for the goals |
| SDG 9 | Industry, innovation and infrastructure | | |

COURSE SUMMARY

The listed courses in the curriculum are broadly classified as per the recommendations from the UGC.

| Sl. No | Broad Category of Course | Minimum Credit Requirement |
|--------|----------------------------------|----------------------------|
| 1 | Major Core (MC) | 80 |
| 2 | Minor Stream (MS) | 32 |
| 3 | Multidisciplinary (MD) | 09 |
| 4 | Ability Enhancement Course (AEC) | 08 |
| 5 | Skill Enhancement Course (SEC) | 09 |
| 6 | Value Added Courses (VAC) | 08 |
| 7 | Summer Internship (SI) | 02 |
| 8 | Project Dissertation (PD) | 12 |
| | Total | 160 |

The semester wise credit breakup of the Curriculum based on the above credit breakup proposed by the UGC is as follows:

| Semester\Category | MC | MS | MD | AEC | SEC | VAC | SI | PD | TOTAL |
|-------------------|-----------|-----------|----------|----------|----------|----------|----------|-----------|------------|
| 1 | 6 | | 9 | 3 | 2 | 2 | | | 22 |
| 2 | 11 | | | 3 | 2 | 4 | | | 20 |
| 3 | 12 | 5 | | | 4 | | | | 21 |
| 4 | 17 | 2 | | | 1 | 1 | | | 21 |
| 5 | 14 | 6 | | | | 1 | | | 21 |
| 6 | 13 | 6 | | | | | | 4 | 23 |
| 7 | 7 | 8 | | 2 | | | 2 | 6 | 25 |
| 8 | | 5 | | | | | | 2 | 7 |
| Total | 80 | 32 | 9 | 8 | 9 | 8 | 2 | 12 | 160 |

Credit Breakup of Proposed Curriculum across Course Categories - Detailed

| Semester | MC | | | MS | | | MD | AEC | SEC | VAC | SI | PD | TOTAL |
|--------------|--------|------------|---------------|--------|------------|---------------|--------|--------|----------------|----------------|----------------|----------------|------------|
| | SSNSoE | Dept Major | Program Major | SSNSoE | Dept Minor | Program Minor | SSNSoE | SSNSoE | Dept / Program | Dept / Program | Dept / Program | Dept / Program | |
| 1 | | 6 | | | | | 9 | 3 | 2 | 2 | | | 22 |
| 2 | 3 | 8 | | | | | | 3 | 2 | 4 | | | 20 |
| 3 | | 12 | | 3 | 2 | | | | 4 | | | | 21 |
| 4 | | 14 | 3 | | 2 | | | | 1 | 1 | | | 21 |
| 5 | | | 14 | | 6 | | | | | 1 | | | 21 |
| 6 | | | 13 | | | 6 | | | | | | 4 | 23 |
| 7 | | | 7 | | | 8 | | 2 | | | 2 | 6 | 25 |
| 8 | | | | | | 5 | | | | | | 2 | 7 |
| Total | 3 | 40 | 37 | 3 | 10 | 19 | 9 | 8 | 9 | 8 | 2 | 12 | 160 |

SEMESTER I

| S. No. | COURSE CODE | COURSE TITLE | COURSE CATEGORY | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------------|-------------|--|-----------------|-----------------|---|-----------|------------|------------|------------|-----------|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Mathematics I | MD | 4 | 45 | 15 | 0 | 60 | 120 | 4 |
| 2 | | Engineering Physics | MD | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 3 | | Engineering Physics Laboratory | MD | 4 | 0 | 0 | 45 | 15 | 60 | 2 |
| 4 | | Communicative English | AEC | 4 | 30 | 0 | 30 | 60 | 120 | 3 |
| 5 | | Introduction to Programming Using C | MC | 3 | 15 | 0 | 30 | 45 | 90 | 3 |
| 6 | | Digital Principles and System Design | MC | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 7 | | Professional Ethics and Human Values | VAC | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 8 | | Version Control and Collaboration Laboratory | SEC | 4 | 0 | 0 | 45 | 15 | 60 | 2 |
| TOTAL | | | | 28 | 195 | 15 | 180 | 300 | 690 | 22 |

SEMESTER II

| S. No. | COURSE CODE | COURSE TITLE | COURSE CATEGORY | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|-------------------|-------------|--|-----------------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Statistics and Probability | MC | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 2 | | English for Engineers | AEC | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 3 | | Programming in Python for Data Science | VAC | 3 | 15 | 0 | 30 | 15 | 60 | 2 |
| 4 | | Environmental Engineering | VAC | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 5 | | Data Structures | MC | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 6 | | Computer Organization and Architecture | MC | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| PRACTICALS | | | | | | | | | | |
| 7 | | Makers Space Laboratory | SEC | 4 | 0 | 0 | 45 | 15 | 60 | 2 |
| 8 | | Data Structures Laboratory | MC | 4 | 0 | 0 | 45 | 15 | 60 | 2 |

| | | | | | | | |
|--------------|-----------|------------|----------|------------|------------|------------|-----------|
| TOTAL | 26 | 210 | 0 | 150 | 240 | 600 | 20 |
|--------------|-----------|------------|----------|------------|------------|------------|-----------|

SEMESTER III

| S. No. | COURSE CODE | COURSE TITLE | COURSE CATEGORY | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|-------------------|-------------|--|-----------------|-----------------|---|----------|------------|------------|------------|-----------|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Mathematics III | MS | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 2 | | Design and Analysis of Algorithm | MC | 6 | 30 | 0 | 45 | 45 | 120 | 4 |
| 3 | | Embedded Programming | MS | 2 | 15 | 0 | 30 | 15 | 60 | 2 |
| 4 | | Operating Systems | MC | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | Design Thinking, Innovation and Entrepreneurship | SEC | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 6 | | Object Oriented Programming | MC | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| PRACTICALS | | | | | | | | | | |
| 7 | | Operating Systems Laboratory | MC | 4 | 0 | 0 | 45 | 15 | 60 | 2 |
| 8 | | Competitive Programming | SEC | 2 | 0 | 0 | 15 | 15 | 30 | 1 |
| TOTAL | | | | 27 | 195 | 0 | 195 | 240 | 630 | 21 |

SEMESTER IV

| S. No. | COURSE CODE | COURSE TITLE | COURSE CATEGORY | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|-------------------|-------------|---------------------------------------|-----------------|-----------------|---|---|----|-------|-----|-----|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Database Management System | MC | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 2 | | Artificial Intelligence | MC | 5 | 45 | 0 | 15 | 45 | 105 | 3.5 |
| 3 | | Software Engineering and Practices | MC | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 4 | | Discrete Mathematics | MC | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | Internet Programming | MS | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 6 | | Microcontrollers and Interfacing | MC | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| PRACTICALS | | | | | | | | | | |
| 7 | | Database Management System Laboratory | MC | 3 | 0 | 0 | 30 | 15 | 45 | 1.5 |
| 8 | | Full Stack Development | SEC | 2 | 0 | 0 | 15 | 15 | 30 | 1 |

| | | | | | | | | | | |
|--------------|--|--|-----|-----------|------------|----------|------------|------------|------------|-----------|
| | | Laboratory | | | | | | | | |
| 9 | | Independent Research / Extra Academic Activity | VAC | 2 | 0 | 0 | 15 | 15 | 30 | 1 |
| TOTAL | | | | 26 | 225 | 0 | 135 | 270 | 630 | 21 |

SEMESTER V

| S. No. | COURSE CODE | COURSE TITLE | COURSE CATEGORY | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|-------------------|-------------|--|-----------------|-----------------|---|----------|------------|------------|------------|-----------|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Distributed Systems | MC | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 2 | | Computer Networks | MC | 6 | 30 | 0 | 45 | 45 | 120 | 4 |
| 3 | | Machine Learning | MC | 6 | 30 | 0 | 45 | 45 | 120 | 4 |
| 4 | | Theory of Computation | MC | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | Principles of Edge Computing | MS | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 6 | | Quantum Computing Fundamentals | MS | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| PRACTICALS | | | | | | | | | | |
| 7 | | Independent Research / Extra Academic Activity | VAC | 2 | 0 | 0 | 15 | 15 | 30 | 1 |
| TOTAL | | | | 26 | 225 | 0 | 135 | 270 | 630 | 21 |

Note: Students Pursuing GPP should register for an additional course on Project Management and Planning (3 credits) under MS category during V semester and this additional credit earned will be adjusted during VIII semester by exempting a minor course of 3 credits.

SEMESTER VI

| S. No. | COURSE CODE | COURSE TITLE | COURSE CATEGORY | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|-------------------------------|-----------------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Computer Graphics | MC | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 2 | | Compiler Design | MC | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 3 | | Agile Methodologies | MC | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 4 | | GPU Computing | MC | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 5 | | Network and Computer Security | MC | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 6 | | Program Minor 1 | MS | 3 | 45 | 0 | 0 | 45 | 90 | 3 |

| | | | | | | | | | | |
|-------------------|--|--------------------------|----|-----------|------------|----------|------------|------------|------------|-----------|
| 7 | | Program Minor 2 | MS | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| PRACTICALS | | | | | | | | | | |
| 8 | | Capstone Project Phase 1 | PD | 8 | 0 | 0 | 60 | 60 | 120 | 4 |
| TOTAL | | | | 30 | 240 | 0 | 150 | 300 | 690 | 23 |

SEMESTER VII

| S. No. | COURSE CODE | COURSE TITLE | COURSE CATEGORY | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|-------------------|-------------|-----------------------------------|-----------------|-----------------|---|----------|------------|------------|------------|-----------|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Cloud Computing | MC | 5 | 45 | 0 | 30 | 45 | 120 | 4 |
| 2 | | Digital Forensics | MC | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 3 | | Program Minor 3 | MS | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 4 | | Program Minor 4 – Basket 1 | MS | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | Program Minor 5 – Basket 2 | MS | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 6 | | Ability Enhancement Course Basket | AEC | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| PRACTICALS | | | | | | | | | | |
| 7 | | Capstone Project Phase 2 | PD | 12 | 0 | 0 | 90 | 90 | 180 | 6 |
| 8 | | Internship | SI | 4 | 0 | 0 | 0 | 160 | 160 | 2 |
| TOTAL | | | | 34 | 240 | 0 | 120 | 490 | 850 | 25 |

SEMESTER VIII

| S. No. | COURSE CODE | COURSE TITLE | COURSE CATEGORY | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|-------------------|-------------|------------------------------|-----------------|-----------------|---|----------|-----------|------------|------------|----------|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Program Minor – 6 – Basket 3 | MS | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 2 | | Program Minor – 7 – Basket 4 | MS | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| PRACTICALS | | | | | | | | | | |
| 3 | | Capstone Project Phase 3 | PD | 4 | 0 | 0 | 30 | 30 | 60 | 2 |
| TOTAL | | | | 9 | 75 | 0 | 30 | 105 | 210 | 7 |

Major Core Courses Department Core Courses

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|--|----------|-----------------|--|---|----|-------|-----|-----|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Introduction to Programming Using C (TCP) | 1 | 3 | 15 | 0 | 30 | 45 | 90 | 3 |
| 2 | | Digital Principles and System Design (TCP) | 1 | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 3 | | Data Structures + Lab | 2 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 4 | | Computer Organization and Architecture | 2 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | Design and Analysis of Algorithm (TCP) | 3 | 6 | 30 | 0 | 45 | 45 | 120 | 4 |
| 6 | | Operating Systems | 3 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 7 | | Operating Systems Lab | 3 | 4 | 0 | 0 | 45 | 15 | 60 | 2 |
| 8 | | Object Oriented Programming (TCP) | 3 | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 9 | | Database Management System | 4 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 10 | | Database Management System Lab | 4 | 3 | 0 | 0 | 30 | 15 | 45 | 1.5 |
| 11 | | Artificial Intelligence (TCP) | 4 | 5 | 45 | 0 | 15 | 45 | 105 | 3.5 |
| 12 | | Software Engineering and Practices (TCP) | 4 | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 13 | | Discrete Mathematics | 4 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |

Programme Core Courses

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|--|----------|-----------------|---|---|----|-------|-----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Microcontrollers and Interfacing (TCP) | 4 | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 2 | | Distributed Systems | 5 | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 3 | | Computer Networks (TCP) | 5 | 6 | 30 | 0 | 45 | 45 | 120 | 4 |
| 4 | | Machine Learning (TCP) | 5 | 6 | 30 | 0 | 45 | 45 | 120 | 4 |
| 5 | | Theory of Computation | 5 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 6 | | Computer Graphics (TCP) | 6 | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 7 | | Compiler Design (TCP) | 6 | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 8 | | Agile Methodologies | 6 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 9 | | GPU Computing | 6 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 10 | | Network and Computer Security | 6 | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 11 | | Cloud Computing (TCP) | 7 | 5 | 45 | 0 | 30 | 45 | 120 | 4 |
| 12 | | Digital Forensics | 7 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |

Department Minor Stream Courses

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|--------------------------------|----------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Embedded Programming | 3 | 2 | 15 | 0 | 30 | 15 | 60 | 2 |
| 2 | | Internet Programming | 4 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 3 | | Principles of Edge Computing | 5 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 4 | | Quantum Computing Fundamentals | 5 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |

MINOR STREAMS

The Department of Computer Science and Engineering offers the following list of Minor Streams.

1. **Intelligent Systems (Foundations)**
2. **Advanced Intelligent Systems (Advanced)**
3. **Quantum Computing (Advanced)**
4. **Immersive Technology (Advanced)**

Each Minor Stream has seven courses worth 19 credits. The student must enroll in any one of the above three Minor Streams.

MINOR STREAM 1- Intelligent Systems (Foundations)

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|-------------------------------|----------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Foundations of AI | 6 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 2 | | Data Analytics | 6 | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 3 | | Image Processing and Analysis | 7 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 4 | | MINOR STREAM BASKET 1 | 7 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | MINOR STREAM BASKET 2 | 7 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 6 | | MINOR STREAM BASKET 3 | 8 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 7 | | MINOR STREAM BASKET 4 | 8 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |

The following is the tentative list of courses that may be offered under the *Minor Stream Baskets*:

| <i>Minor Stream Basket 1 (3 Credit courses)</i> | <i>Minor Stream Basket 2 (2 Credit courses)</i> | <i>Minor Stream Basket 3 (2 Credit courses)</i> | <i>Minor Stream Basket 4 (3 Credit courses)</i> |
|---|---|---|---|
| Mathematics for AI | Data Warehousing and Data Mining | Machine Learning for Sensor Data | Neural Networks and Machine Learning |
| Statistical Learning for Engineering Applications | Big Data Analytics | AI for Automation and Robotics | Visual Scene Understanding |
| Applied Predictive Modeling | Cloud Computing and Virtualization | AI for Sustainable and Smart Systems | Foundations of Natural Language Processing |
| | Social Media Analytics | AI in IoT and Edge Computing | |

MINOR STREAM 2- Advanced Intelligent Systems (Advanced)

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|-----------------------------|----------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Computer Vision | 6 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 2 | | Natural Language Processing | 6 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 3 | | Deep Learning | 7 | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 4 | | MINOR STREAM BASKET 1 | 7 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | MINOR STREAM BASKET 2 | 7 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 6 | | MINOR STREAM BASKET 3 | 8 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 7 | | MINOR STREAM BASKET 4 | 8 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |

The following is the tentative list of courses that may be offered under the *Minor Stream Baskets*:

| <i>Minor Stream Basket 1 (3 Credit courses)</i> | <i>Minor Stream Basket 2 (2 Credit courses)</i> | <i>Minor Stream Basket 3 (2 Credit courses)</i> | <i>Minor Stream Basket 4 (3 Credit courses)</i> |
|---|---|---|---|
| Reinforcement Learning and Decision Making | Multi-Modal Machine Learning | Visual Intelligence and Analytics | LLM and Generative AI |
| Bayesian Inference and Learning | Probabilistic Graphical Models | Vision for Edge and Low-Power Devices | AI Ethics and Fairness |
| Optimization Techniques for AI | Cognitive Computing | Industrial and Surveillance Vision Systems | Applied Agentic AI |
| Adversarial Machine Learning | Sustainable AI and Green Computing | Vision for Robotics and Autonomous Systems | Edge AI |

MINOR STREAM 3 - Quantum Computing (Advanced)

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|--|----------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Mathematical Foundations for Quantum Computing | 6 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 2 | | Quantum Machine Learning | 6 | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 3 | | Quantum Algorithms and Complexity | 7 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 4 | | MINOR STREAM BASKET 1 | 7 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | MINOR STREAM BASKET 2 | 7 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 6 | | MINOR STREAM BASKET 3 | 8 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 7 | | MINOR STREAM BASKET 4 | 8 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |

The following is the tentative list of courses that may be offered under the *Minor Stream Baskets*:

| <i>Minor Stream Basket 1 (3 Credit courses)</i> | <i>Minor Stream Basket 2 (2 Credit courses)</i> | <i>Minor Stream Basket 3 (2 Credit courses)</i> | <i>Minor Stream Basket 4 (3 Credit courses)</i> |
|--|--|--|--|
| Quantum Programming and Simulation | Quantum Information Theory | Quantum Sensor Networks and IoT | Quantum Cryptography and Communication |
| Principles of Quantum Mechanics for Computing | Quantum Error Correction and Fault Tolerance | Hybrid Quantum-Classical Computing | Quantum Networking and Internet |
| Quantum Optimization | Quantum Hardware and Systems | Quantum Computing in Finance | Advanced Quantum Machine Learning |

MINOR STREAM 4 - Immersive Technology (Advanced)

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|--|----------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Introduction to Immersive Technologies | 6 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 2 | | Virtual Reality Design and Development | 6 | 3 | 30 | 0 | 30 | 30 | 90 | 3 |
| 3 | | Artificial Intelligence for Immersive Environments | 7 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 4 | | MINOR STREAM BASKET 1 | 7 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 5 | | MINOR STREAM BASKET 2 | 7 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 6 | | MINOR STREAM BASKET 3 | 8 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 7 | | MINOR STREAM BASKET 4 | 8 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |

The following is the tentative list of courses that may be offered under the *Minor Stream Baskets*:

| <i>Minor Stream Basket 1 (3 Credit courses)</i> | <i>Minor Stream Basket 2 (2 Credit courses)</i> | <i>Minor Stream Basket 3 (2 Credit courses)</i> | <i>Minor Stream Basket 4 (3 Credit courses)</i> |
|---|---|---|---|
| Human-Computer Interaction (HCI) | Virtual Reality Design and Development | Computer Vision for AR/VR | Cloud and Edge Computing for XR |
| 3D Modeling and Animation | Augmented Reality Systems and Applications | Spatial Computing and Digital Twins | Security and Privacy in Immersive Systems |
| Programming for Immersive Environments | Mixed Reality and Spatial Interaction | Immersive Audio and Haptics | Immersive Data Visualization and Analytics |

Multi-Disciplinary Courses

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|--------------------------------|----------|-----------------|---|----|----|-------|-----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Mathematics I | 1 | 4 | 45 | 15 | 0 | 60 | 120 | 4 |
| 2 | | Engineering Physics | 1 | 3 | 45 | 0 | 0 | 45 | 90 | 3 |
| 3 | | Engineering Physics Laboratory | 1 | 4 | 0 | 0 | 45 | 15 | 60 | 2 |

Skill Enhancement Courses

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|--|----------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Version Control and Collaboration Laboratory | 1 | 4 | 0 | 0 | 45 | 15 | 60 | 2 |
| 2 | | Makers Space Laboratory | 2 | 4 | 0 | 0 | 45 | 15 | 60 | 2 |
| 3 | | Design Thinking, Innovation and Entrepreneurship | 3 | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 4 | | Competitive Programming | 3 | 2 | 0 | 0 | 15 | 15 | 30 | 1 |
| 5 | | Full Stack Development Laboratory | 4 | 2 | 0 | 0 | 15 | 15 | 30 | 1 |

Ability Enhancement Courses

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|-----------------------------------|----------|-----------------|---|---|----|-------|-----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Communicative English | 1 | 4 | 30 | 0 | 30 | 60 | 120 | 3 |
| 2 | | English for Engineers | 2 | 4 | 30 | 0 | 30 | 30 | 90 | 3 |
| 3 | | Ability Enhancement Course Basket | 7 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |

Value Added Courses

| S. No. | COURSE CODE | COURSE TITLE | SEMESTER | CONTACT PERIODS | Teaching and Learning Scheme (per semester) | | | | | |
|--------|-------------|--|----------|-----------------|---|---|----|-------|----|---|
| | | | | | L | T | P | TW&SL | TH | C |
| 1 | | Professional Ethics and Human Values | 1 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 2 | | Programming in Python for Data Science | 2 | 3 | 15 | 0 | 30 | 15 | 60 | 2 |
| 3 | | Environmental Engineering | 2 | 2 | 30 | 0 | 0 | 30 | 60 | 2 |
| 4 | | Independent Research / Extra Academic Activity | 4 | 2 | 0 | 0 | 15 | 15 | 30 | 1 |

| | | | | | | | | | | |
|---|--|--|---|---|---|---|----|----|----|---|
| 5 | | Independent Research / Extra Academic Activity | 5 | 2 | 0 | 0 | 15 | 15 | 30 | 1 |
|---|--|--|---|---|---|---|----|----|----|---|

GRAND PROJECT PATHWAY

| Semester | Course | Credit |
|-----------------------------|--|-----------|
| III | Design Thinking, Innovation and Entrepreneurship | 3 |
| IV | Independent Research /Extra Academic Activity | 1 |
| V | Independent Research /Extra Academic Activity | 1 |
| V | Project Management and Planning | 3 |
| VI | Capstone Project Phase 1 | 4 |
| VII | Capstone Project Phase 2 | 6 |
| VIII | Capstone Project Phase 3 | 2 |
| Total Credit for GPP | | 20 |

L - Lecture, T - Tutorial, P - Practical, TW & SL – Term Work & Self Learning, TH – Total Hours , C – Credits and TCP – Theory Cum Practical Course

CHENNAI