

22



SAHRDAYA **AUTONOMOUS**
COLLEGE OF ENGINEERING & TECHNOLOGY

A CENTRE OF EXCELLENCE IN SCIENCE & TECHNOLOGY | MANAGED BY IRINJALAKUDA DIOCESAN EDUCATION TRUST

Approved by AICTE & Affiliated to APJ Abdul Kalam Technological University | Accredited by:



B. Tech

Curriculum (2024) - Semester I to VIII

Computer Science and Engineering

Branch Code: CSE

(SHR/AC/Auto/Acad. Council/B.Tech/2/Curri. /CSE)

Recommended by BoS on 30/08/2024

Approved by Academic Council on 31/08/2024

EDUCATION IS DEDICATION

Preface to the Curriculum

The B.Tech Computer Science and Engineering (CSE) curriculum is meticulously crafted to cultivate industry-ready professionals endowed with creativity and innovative thinking. This comprehensive curriculum encompasses various components, including induction programs, core and elective courses, practical courses, projects, internships, skill enhancement courses, and extracurricular activities. Designed to total 170 credits, the curriculum ensures a holistic education that prepares students for the dynamic field of Computer Science & Engineering. Below is a detailed overview of the curriculum's salient features:

- 1. Project-Based Learning Courses:** From the first semester to the fifth semester, one course integrated with Project-Based Learning (PBL) empowers students with autonomy, engaging them in meaningful projects to learn, explore, and investigate. PBL promotes teamwork and collaboration, essential skills for any professional, by having students work together in teams, each contributing unique skills and perspectives to achieve a common goal.
- 2. Skill Enhancement Courses:** These courses are designed to provide students with industry-relevant certifications from reputed organizations, enhancing their employability by certifying their skill sets. They are integral to the academic curriculum and offered from Semester 1 to Semester 5, each carrying one credit.
- 3. Foreign Language Courses:** To prepare students for global careers, the curriculum includes options to learn foreign languages, promoting cross-cultural communication skills and international collaboration. These courses are available in the seventh semester.
- 4. Program Electives and Micro Specializations:** Students can pursue micro-specializations by completing thematic courses, which allow them to gain in-depth knowledge in specific sub-areas of their discipline. Starting in the fourth semester, this provides an opportunity for focused learning and expertise in emerging fields in alignment with program elective courses.
- 5. Industry Elective Courses:** Offered jointly with industry partners, these courses ensure relevance and practical applicability. The academic department and industry partners develop and assess them collaboratively, without end-semester examinations, ensuring continuous and practical learning experiences.
- 6. Startups and Entrepreneurial Skills:** The curriculum encourages students to pursue startups, offering options to engage in product-based or service-based startups during their seventh and eighth semesters. This fosters innovation, creativity, and entrepreneurial skills, preparing students for the dynamic business environment.
- 7. Courses Embedded with Practical:** The curriculum includes theory courses embedded with practical and projects, ensuring that students apply theoretical

knowledge to real-world problems. This hands-on approach enhances learning outcomes and practical skills.

- 8. Internships:** The program includes mandatory internships, allowing students to gain industry exposure and practical experience. Students can undertake at least four to six months of internship in a recognized industry, research organization, or prestigious institution relevant to their field. This bridges the gap between academic learning and industry requirements, enhancing employability.
- 9. Community Work, Social Responsibility, and Universal Human Value Courses:** The curriculum integrates opportunities for community work and socially relevant projects, promoting civic responsibility and leadership skills. Universal Human Value courses also aim to cultivate a holistic understanding of life, enhancing physical and mental well-being, social skills, and life skills. These courses address various dimensions of life, including individual, family, society, and the environment, promoting a healthy and harmonious lifestyle.
- 10. Activity Points:** In addition to academic credits, students must earn activity points through participation in extracurricular activities such as sports, cultural events, community service, and entrepreneurship. This holistic approach ensures the development of leadership, teamwork, and communication skills, preparing students for global challenges.
- 11. MOOC Courses:** Students selected for internships can fulfil their credit requirements in the seventh and eighth semesters through MOOC courses, providing flexibility and additional learning opportunities.
- 12. Higher Credit Elective:** These courses carry more than the standard credit weight of elective courses. They allow students pursuing honors to reduce the number of required courses by earning additional credits through higher-credit electives. Additional credits earned from higher credit electives can be credited towards the total credit requirement of the honors program, with a maximum of 12 additional credits being applied towards the honors credit requirement.

This curriculum is designed to seamlessly blend theoretical knowledge with practical experience, foster interdisciplinary learning, and enhance employability through hands-on projects and internships, thereby preparing students for successful careers in Computer Science & Engineering.

General Course Structure

1. Credit and Courses:

Credits are a unit of measurement for coursework and are based on the number of hours of instruction required per week. One hour of classroom lecture (L) that is 60 minutes long per week carried out during all weeks of the semester, is considered one Instructional Unit or one Credit. The same goes for a tutorial (T) or a project (R) that is 60 minutes long per week and carried out during all weeks of the semester. In addition, a minimum of 120 minutes per week of laboratory session, practical or fieldwork, training (P) or a combination of these, carried out during all weeks of the semester, is also

considered one Instructional Unit or one Credit.

| Classification | Credit assigned |
|----------------------------------|------------------------|
| 1 Hour Lecture [L] per week | 1 Credit |
| 1 Hour Tutorial [T] per week | 1 Credit |
| 1 Hour Project [R] per week | 1 Credit |
| 1-2 Hours Practical [P] per week | 1 Credit |
| 3-4 Hours Practical [P] per week | 2 Credit |

- For internship/Start-Up/Main project/Mini project, the credit weightage for equivalent hours is 50% of that for lectures/tutorials

The B.Tech. program curriculum has a total of 168 academic credits and 2 additional pass/fail credits that can be gained through 100 activity points. The program is expected to accommodate courses from other disciplines so that students have multi-disciplinary exposure. Additionally, the program should provide sufficient opportunities for students to enhance their communication, soft, managerial, and technical skills. Depending on the program, the courses should fall under the engineering, basic science, humanities science, and management categories. The structure of the UG program should essentially have the following categories of courses with the breakup of credits as given:

| Sl. No | Category | Code | Credits |
|--------------------------------|--|-------------|----------------|
| 1 | Humanities and Social Sciences including Management Courses | HMC | 9 |
| 2 | Basic Science Courses | BSC | 20 |
| 3 | Engineering Science Courses | ESC | 26 |
| 4 | Programme (Professional) Core Courses | PCC | 52 |
| 5 | Programme (Professional) Core Courses-Project Based Learning | PBL | 16 |
| 6 | Program Elective Courses | PEC | 18 |
| 7 | Open Elective Courses/Industry Linked Elective | OEC/ILE | 9 |
| 8 | Project Work and Seminar | PS | 12 |
| 9 | UHV and Community Work | PW | 1 |
| 10 | Skill Enhancement Courses | SEC | 5 |
| 11 | Mandatory Student Activities. | MSA | 2 |
| Total Mandatory Credits | | 170 | |

A 10% to 15 % deviation in credits is permitted under each discipline. While developing the curriculum, the department offering the program should ensure that the students attain the above distribution upon completing their program. Either Minor or Honors can be opted from the optional specialization.

The courses are organized into 1/2/3/4 credit courses based on the content delivery mechanism and desired depth of the course. The delivery methods include Theory-only,

Theory with tutorial, Theory with practice, Theory with project etc. The L-T-P-R notation for each course signifies the allocation of hours for content delivery in terms of Lecture (L), Tutorial (T), Practical (P), and Project (R) per week, as well as the credit earned from the course. The L-T-P- R-C for each course indicates the number of credits delivered as Lecture (L), Tutorial (T), Practical (P), Project (R) and the total instructional delivery indicated as Credits (C).

$$C = L+ T + [P/2] + R$$

Apart from lectures, tutorials, practical/practice and project hours, the curriculum offers Self-learning hours (S) that indicate the number of hours students are expected to spend for activities that should be completed outside the class defined by the faculty handling courses. The activities aim to support learning and should be initiated by the students themselves without guidance or direction from tutors. For each course, the self-learning hour per week is calculated as:

$$S= (L*1+P*1+[R/2])$$

Categories of courses included in the curriculum and their L-T-P-R-C components are given in the table below:

| Sl. No. | Lecture- Tutorial- Practical- Project [L-T-P-R] | Credit [C] | Description |
|----------------------|---|------------|--|
| 1. | 1-0-2-0 | 2 | Theory course without End Semester Examination [ESE] |
| 2. | 1-0-0-0 | 1 | |
| 3. | 2-0-2-1 | 4 | Theory course embedded with practical and project |
| 4. | 3-1-0-0 | 4 | Theory course embedded with tutorial |
| 5. | 3-0-0-0 | 3 | Theory course |
| 6. | 2-0-0-0 | 2 | |
| 7. | 3-0-2-0 | 4 | Theory course embedded with practical |
| 8. | 3-0-0-1 | 4 | Theory course embedded with project |
| 9. | 0-0-2-0 | 1 | Practical course without ESE |
| 10. | 0-0-3-0 | 2 | Practical course |
| 11. | 0-0-0-3 | 2 | Mini Project |
| 12. | 0-0-3-0 | 2 | Seminar |
| 13. | 0-0-0-8 | 4 | Major Project/Internship/Start-Up |
| 14. | 0-0-0-0 | 1 | MOOC Course |
| Mandatory Courses | | | |
| 15. | 0-0-2-0 | 1 | Skill Enhancement Courses |
| Minor/ Honors Course | | | |
| 16. | 4-0-0-0 | 4 | Theory course |
| 17. | 0-0-0-4 | 4 | Project only course |

3. Course Code

Every course of B. Tech. The program shall take a code from the table given below.

| Course category | Description |
|------------------------|---|
| PCC | Program (Professional) Core Courses |
| PBL | Project Based Learning |
| CLT | Combined Lab Theory |
| PEC | Professional Elective Course |
| OEC | Open Elective Course |
| BSC | Basic Science Course |
| ESC | Engineering Science Course |
| HMC | Humanities, Social Sciences and Management course |
| MOOC | MOOC Course |
| IEL | Industry Elective Course |
| PW | Socially Relevant course |
| PS | Project Work and Seminar |
| SEC | Skill Enhancement Courses |
| HR | Honours |
| MR | Minor |

Structure of Course Code: Each course will be identified by a unique Course Code consisting of eight alphanumeric characters, formatted as **24XXYABC**. The code can be interpreted as follows: "24" represents the regulation year, "XX" is the course category code, "Y" indicates the course delivery mode, "A" is the semester number (ranging from 1 to 8, with 0 indicating the course is offered in both odd and even semesters), "B" denotes the version of the course under each category, and "C" signifies the course sequence number. For example, 24CET303 is a theory course offered by the civil engineering department in the third semester of the 2024 scheme.

24BML408 - laboratory course offered by the biomedical engineering department in the fourth semester of the 2024 scheme

The detailed expansion of the abbreviation of the course code structure is listed in the table below:

| XX | Y | A | B | C |
|--|------------------------|-------------|-----------------------|----------------------|
| Course category | Course delivery mode | Semester No | Version of the course | Serial No: of course |
| BM-Biomedical Engineering | T-Theory | | | |
| BT-Biotechnology | L-Laboratory | | | |
| CE – Civil Engineering | R-Theory | | | |
| CS-Computer Science Engineering | Embedded with Project | | | |
| EC-Electronics and Communication Engineering | K-Certification Course | 0 | 1 | 1 |
| | E-Elective Course | 1 | 2 | 2 |
| | H-Honour | 2 | 3 | 3 |

| | | | | |
|---|------------------------------------|------|------|------|
| EE-Electrical and Electronics Engineering | M-Minor | 3 | etc. | 4 |
| MA-Mathematics | O-Open Elective | etc. | | 5 |
| CY – Chemistry | I-Industry Elective | | | 6 |
| PH-Physics | S-Seminar | | | etc. |
| ES-Engineering Science course | P-Project | | | |
| HU-Humanities and Management Courses | N-Internship | | | |
| SE-Skill Enhancement Courses | U-Start Up | | | |
| PW-Social Science and Community work | C – Theory Embedded with practical | | | |

4. Allotted and Cumulative Credits

The allotted and cumulative credits are given in the table below:

| Semester | Allotted Credits | Cumulative Credits |
|----------|------------------|--------------------|
| First | 21 | - |
| Second | 22 | 43 |
| Third | 26 | 69 |
| Fourth | 24 | 93 |
| Fifth | 24 | 117 |
| Sixth | 23 | 140 |
| Seventh | 17 | 157 |
| Eighth | 11 | 168 |

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| FIRST SEMESTER (July-December) | | | | | | | | | | | | |
|--------------------------------------|------|-------------|-------------|---|------------------|---|---|---|-------------|-----|-----------|-----------|
| 10 Days Compulsory Induction Program | | | | | | | | | | | | |
| Sl. No. | Slot | Course Code | Course Type | Course Title (Course Name) | Credit Structure | | | | Total Marks | | Credits | Hrs./Week |
| | | | | | L | T | P | R | CIA | ESE | | |
| 1 | A | 24MAT111 | BSC | Calculus & Linear Programming | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 2 | B | 24PHT112 | BSC-CLT | Physics for Information Science | 3 | 0 | 2 | 0 | 50 | 50 | 4 | 5 |
| 3 | C | 24EST003 | ESC | Engineering Graphics | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 4 | D | 24EST104 | ESC | Foundations of Computing | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 4 |
| 5 | F | 24ESR105 | ESC-PBL | Algorithmic Thinking with Python | 2 | 0 | 2 | 1 | 50 | 50 | 4 | 5 |
| 6 | I* | 24HUT006 | HMC | Professional Ethics and Sustainable Development | 1 | 0 | 2 | 0 | 100 | --- | 2 | 3 |
| 7 | L | 24ESL007 | ESC | Computer Aided Drawing (CAD) & Manufacturing Workshop | 0 | 0 | 2 | 0 | 50 | --- | 1 | 2 |
| 8 | J* | 24SEK10N | SEC | Skill Enhancement Course 1 | | | | | | | 1 | |
| Total | | | | | | | | | | | 21 | 25 |

| SECOND SEMESTER (January-June) | | | | | | | | | | | | |
|--------------------------------|------|-------------|-------------|---|------------------|---|---|---|-------------|-----|-----------|-----------|
| Sl. No. : | Slot | Course Code | Course Type | Course Title (Course Name) | Credit Structure | | | | Total Marks | | Credits | Hrs./Week |
| | | | | | L | T | P | R | CIA | ESE | | |
| 1 | A | 24MAT211 | BSC | Linear Algebra | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 2 | B | 24CYT012 | BSC-CLT | Engineering Chemistry | 3 | 0 | 2 | 0 | 50 | 50 | 4 | 5 |
| 3 | C | 24EST023 | ESC | Fundamentals of Electrical & Electronics Engineering | 4 | 0 | 0 | 0 | 40 | 60 | 4 | 4 |
| 4 | D | 24ESC204 | ESC | Programming in C | 3 | 0 | 2 | 0 | 40 | 60 | 4 | 5 |
| 5 | E | 24CSR205 | PCC-PBL | Digital System Design | 3 | 0 | 0 | 1 | 50 | 50 | 4 | 4 |
| 6 | L | 24ESL006 | ESC | Basic Electrical and Electronics Engineering Workshop | 0 | 0 | 2 | 0 | 50 | --- | 1 | 2 |
| 7 | I* | 24HUT107 | HMC | Communicative English | 0 | 0 | 2 | 0 | 100 | -- | 1 | 2 |
| 8 | J* | 24SEK10N | SEC | Skill Enhancement Course 2 | | | | | | | 1 | |
| Total | | | | | | | | | | | 22 | 25 |

**No Grade Points will be awarded for the MOOC, I and J slot courses.*

*The self-learning (S) hours for each course is calculated based on the formulae, S= (L*1+P*1+[R/2])*

| THIRD SEMESTER(July-December) | | | | | | | | | | | | |
|--------------------------------------|------|-------------|-------------|---|------------------|---|---|---|-------------|-----|--------------------|--------------------|
| Sl. No: | Slot | Course Code | Course Type | Course Title (Course Name) | Credit Structure | | | | Total Marks | | Credits | Hrs /Week |
| | | | | | L | T | P | R | CIA | ESE | | |
| 1 | A | 24MAT311 | BSC | Discrete Mathematics & Statistics | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 2 | B | 24CST302 | PCC | Theory of Computation | 3 | 1 | 0 | 0 | 40 | 60 | 4 | 4 |
| 3 | C | 24CST303 | PCC | Data Structures and Algorithms | 3 | 1 | 0 | 0 | 40 | 60 | 4 | 4 |
| 4 | D | 24CSR304 | PCC-PBL | Object Oriented Programming | 3 | 0 | 0 | 1 | 50 | 50 | 4 | 4 |
| 5 | E | 24EST315 | ESC | Computer Organization and Architecture | 4 | 0 | 0 | 0 | 40 | 60 | 4 | 4 |
| 6 | L | 24CSL306 | PCL | Data Structure Lab | 0 | 0 | 3 | 0 | 50 | 50 | 2 | 3 |
| 7 | Q | 24CSL307 | PCL | Hardware Lab | 0 | 0 | 3 | 0 | 50 | 50 | 2 | 3 |
| 8 | I* | 24PWT208 | PW | UHV II, Life Skill and Communitive Work | 1 | 0 | 0 | 0 | 100 | - | 1 | 2 |
| 9 | J* | 24SEK10N | SEC | Skill Enhancement Course 3 | | | | | | | 1 | |
| 10 | R/M | 24CSG3XX | VAC | Remedial/Minor/Course | | | | | | | 4* | 4* |
| Total | | | | | | | | | | | 25/ 29* | 26/ 30* |

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| FOURTH SEMESTER (January-June) | | | | | | | | | | | | |
|--------------------------------|------|-----------------------|-------------|-----------------------------------|------------------|---|---|---|-------------|-----|--------------------|--------------------|
| Sl. No: | Slot | Course Code | Course Type | Course Title (Course Name) | Credit Structure | | | | Total Marks | | Credits | Hrs./Week |
| | | | | | L | T | P | R | CIA | ESE | | |
| 1 | A | 24MAT411 | BSC | Graph Theory | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 2 | B | 24CST402 | PCC | Operating System | 3 | 1 | 0 | 0 | 40 | 60 | 4 | 4 |
| 3 | C | 24CST403 | PCC | Design and Analysis of Algorithms | 3 | 1 | 0 | 0 | 40 | 60 | 4 | 4 |
| 4 | D | 24CSE404 | PCC-PBL | Database Management System | 3 | 0 | 0 | 1 | 50 | 50 | 4 | 4 |
| 5 | E | 24HUT005 | HMC | Engineering Economics | 2 | 0 | 0 | 0 | 50 | 50 | 2 | 2 |
| 6 | G | 24CSE41N | PE | PE-1 | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 7 | L | 24CSL207 | PCL | Operating System Lab | 0 | 0 | 3 | 0 | 50 | 50 | 2 | 3 |
| 8 | Q | 24CSL208 | PCL | Database Management System Lab | 0 | 0 | 3 | 0 | 50 | 50 | 2 | 3 |
| 9 | J* | 24SEK10N | SEC | Skill Enhancement Course 4 | | | | | | | 1 | |
| 10 | R/M | 24CSG4XX/ 24CSH4XX | VAC | Remedial/Minor/Honours Course | | | | | | | 4* | 4* |
| Total | | | | | | | | | | | 25/ 29* | 26/ 30* |

PROGRAM ELECTIVE 1: CSE41N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|------|-------------|---------------------------------|---------|-------|--------|
| C | 24CSE 411 | Advanced Data Structures | 3-0-0-0 | 3 | 3 |
| | 24CSE 412 | UI/UX Design | 3-0-0-0 | 3 | 3 |
| | 24CSE 413 | Coding Theory | 3-0-0-0 | 3 | 3 |
| | 24CSE 414 | VLSI Design | 3-0-0-0 | 3 | 3 |
| | 24CSE 415 | Functional Programming | 3-0-0-0 | 3 | 3 |
| | 24CSE 416 | Mobile Application Development# | 2-1-0-2 | 5 | 5 |

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| FIFTH SEMESTER (July-December) | | | | | | | | | | | | |
|--------------------------------|---------------|---|-------------|-----------------------------------|------------------|---|---|---|-------------|-----|--------------------|--------------------|
| Sl. No: | Slot | Course Code | Course Type | Course Title (Course Name) | Credit Structure | | | | Total Marks | | Credits | Hrs./Week |
| | | | | | L | T | P | R | CIA | ESE | | |
| 1 | A | 24CST501 | PCC | Computer Networks | 3 | 1 | 0 | 0 | 40 | 60 | 4 | 4 |
| 2 | B | 24CST502 | PCC | Software Engineering | 3 | 1 | 0 | 0 | 40 | 60 | 4 | 4 |
| 3 | C | 24CST503 | PCC | Machine Learning | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 4 | D | 24CSR504 | PCC-PBL | Data Science and Data Engineering | 3 | 0 | 0 | 1 | 50 | 50 | 4 | 4 |
| 5 | E | 24CSE52N | PE | PE-2 | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 6 | I* | 24HUM506 | HMC | Constitution Of India (MOOC) | - | - | - | - | - | - | 1 | - |
| 7 | L | 24CSL507 | PCL | Machine Learning Lab | 0 | 0 | 3 | 0 | 50 | 50 | 2 | 3 |
| 8 | Q | 24CSL508 | PCL | Computer Networks Lab | 0 | 0 | 3 | 0 | 50 | 50 | 2 | 3 |
| 9 | J* | 24SEK10N | SEC | Skill Enhancement Course 5 | | | | | | | 1 | |
| 10 | R/ M/ H | 24CSG5XX/ 24CSH5XX | VAC | Remedial/Minor/Honours | | | | | | | 4* | 4* |
| | S5/ S6 | Industrial Visit (Maximum 12 Days are permitted, Not Exceedingly more than 6 Working Days) /Industrial Training | | | | | | | | | | |
| Total | | | | | | | | | | | 24/ 28* | 24/ 28* |

PROGRAM ELECTIVE 2: CSE52N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|----------|-------------|-----------------------------|----------------|----------|----------|
| C | 24CSE 521 | Software Project Management | 3-0-0-0 | 3 | 3 |
| | 24CSE522 | Information Security | 3-0-0-0 | 3 | 3 |
| | 24CSE 522 | Social Media Analysis | 3-0-0-0 | 3 | 3 |
| | 24CSE 523 | Deep Learning | 3-0-0-0 | 3 | 3 |
| | 24CSE 524 | Wireless & Mobile Computing | 3-0-0-0 | 3 | 3 |
| | 24CSE 525 | Advanced Database Systems | 3-0-0-0 | 3 | 3 |
| | 24CSE 526 | Web Technologies# | 2-1-0-2 | 5 | 5 |

#- Higher credit electives

| SIXTH SEMESTER (January-June) | | | | | | | | | | | | |
|--------------------------------------|-------|---|-------------|---|------------------|---|---|---|-------------|-----|---------------|---------------|
| Sl. No: | Slot | Course Code | Course Type | Course Title (Course Name) | Credit Structure | | | | Total Marks | | Credits | Hrs./Week |
| | | | | | L | T | P | R | CIA | ESE | | |
| 1 | A | 24CST601 | PCC | Compiler Design | 3 | 1 | 0 | 0 | 40 | 60 | 4 | 4 |
| 2 | B | 24CST602 | PCC | High performance Computing Systems | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 3 | C | 24CSE63N | PE | PE-3 | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 4 | D | 24CSC604 | PCC-CLT | Computer Vision and image Processing | 3 | 0 | 2 | 0 | 50 | 50 | 4 | 4 |
| 5 | F | 24EST605 | ESC | Design Thinking and Product Development | 2 | 0 | 0 | 0 | 50 | 50 | 2 | 2 |
| 6 | O | 24CSO61N /24CSI61N | OE/ILE | OE/ILE-1 | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 7 | L | 24CSL607 | PCL | Systems Lab | 0 | 0 | 3 | 0 | 50 | 50 | 2 | 3 |
| 8 | P | 24CSP608 | PS | Mini Project | 0 | 0 | 6 | 0 | 100 | --- | 2 | 3 |
| 9 | R/M/H | 24CSG6XX/24CSH6XX | VAC | Remedial/Minor/Honours Course | | | | | | | 4* | 4* |
| | S5/S6 | Industrial Visit (Maximum 12 Days are permitted, Not Exceedingly more than 6 Working Days) /Industrial Training | | | | | | | | | | |
| Total | | | | | | | | | | | 23/27* | 25/29* |

Note: Open Electives are courses that other departments will offer.

PROGRAM ELECTIVE 3: 24CSE63N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|----------|-------------|--|---------|----------|----------|
| A | 24CSE 631 | Software Testing | 3-0-0-0 | 3 | 3 |
| | 24CSE 632 | Natural Language Processing | 3-0-0-0 | | 3 |
| | 24CSE 633 | Block chain | 3-0-0-0 | | 3 |
| | 24CSE 634 | Fundamentals of Cyber Security | 3-0-0-0 | | 3 |
| | 24CSE 635 | Big Data Analytics | 3-0-0-0 | | 3 |
| | 24CSE 636 | Pattern Recognition | 3-0-0-0 | | 3 |
| | 24CSE 636 | Augmented Reality and Virtual Reality# | 2-1-0-2 | 5 | 5 |

#- Higher credit electives

OPEN ELECTIVE 1: 24 CSO61N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|----------|-------------|--------------------------------|---------|----------|----------|
| O | 24CSO611 | Data Structures | 3-0-0-0 | 3 | 3 |
| | 24CSO612 | Data Communication | 3-0-0-0 | | 3 |
| | 24CSO613 | Foundations Of Cryptography | 3-0-0-0 | | 3 |
| | 24CSO614 | Machine Learning for Engineers | 3-0-0-0 | | 3 |

| | | | | | |
|--|----------|-------------------------|---------|--|---|
| | 24CS0615 | Computer Graphics | 3-0-0-0 | | 3 |
| | 24CS0616 | Python For Data Science | 3-0-0-0 | | 3 |
| | 24CS0617 | Cloud Computing | 3-0-0-0 | | 3 |



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| SEVENTH SEMESTER (July-December) | | | | | | | | | | | | |
|----------------------------------|-----------|------------------------------------|-------------|--|------------------|---|---|---|-------------|-----|--------------------|--------------------|
| Sl. No: | Slot | Course Code | Course Type | Course Title (Course Name) | Credit Structure | | | | Total Marks | | Credits | Hrs./Week |
| | | | | | L | T | P | R | CIA | ESE | | |
| 1 | A | 24CSE74N/ 24CSM74N | PE | PE-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 2 | B | 24CSE75N/ 24CSM75N | PE | PE-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 3 | O | 24CSO72N/ 24CSI72/ 24CSM73N | OE/ ILE | OE/ILE-2 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 4 | I* | 24HUT704/ 24HUM70N | HMC | Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 2 | 0 | 0 | 0 | 50 | 50 | 2 | 2 |
| 5 | S | 24CSS705 | PS | Seminar | 0 | 0 | 3 | 0 | 50 | 0 | 2 | 3 |
| 6 | P | 24CSP706/ 24CSN706/ 24CSU706 | PS | Option 1: Major Project Option 2: Internship (4-6 Months) Option 3: Start Up | 0 | 0 | 0 | 8 | 100 | 0 | 4 | 8 |
| | R/M/ H | 24CSG7XX/ 24CSH7XX | VAC | Remedial/Minor/Honours Course | | | | | | | 4* | 4* |
| Total | | | | | | | | | | | 17/ 21* | 22/ 26* |

*No Grade Points will be awarded for the I slot courses

*The students can take the internship option either in 7th or in 8th semester.

* Option 1: Work on a Project in the institute/department under the mentorship of faculty members.

Option 2: Full semester Internship in Industry/organization (7th or 8th semester)

PROGRAM ELECTIVE 4: 24CSE74N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|----------|-------------|--|---------|-------|--------|
| B | 24CSE741 | Formal Methods in Software Engineering | 3-0-0-0 | 3 | 3 |
| | 24CSE742 | Security of Machine Learning and AI | 3-0-0-0 | | 3 |
| | 24CSE743 | Cyber Forensic | 3-0-0-0 | | 3 |
| | 24CSE744 | Explainable AI | 3-0-0-0 | | 3 |
| | 24CSE745 | Embedded Systems | 3-0-0-0 | | 3 |
| | 24CSE746 | Ethical Hacking# | 2-1-0-2 | 5 | |

PROGRAM ELECTIVE 5: 24CSE75N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|----------|-------------|-------------------------------------|---------|-------|--------|
| A | 24CSE751 | Advanced Computer Networks | 3-0-0-0 | 3 | 3 |
| | 24CSE752 | Responsible Artificial Intelligence | 3-0-0-0 | | 3 |
| | 24CSE753 | Bioinformatics | 3-0-0-0 | | 3 |
| | 24CSE754 | Digital Forensics | 3-0-0-0 | | 3 |
| | 24CSE755 | Game Theory and Mechanism Design | 3-0-0-0 | | 3 |
| | 24CSE756 | Programming Languages | 3-0-0-0 | | 3 |
| | 24CSE757 | Internet of Things# | 3-0-0-2 | 5 | 5 |

#- Higher credit electives

OPEN ELECTIVE 2: 24CS072N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|----------|-------------|-------------------------------|---------|-------|--------|
| O | 24CS0721 | Cyber Security | 3-0-0-0 | 3 | 3 |
| | 24CS0722 | Web Programming | 3-0-0-0 | | 3 |
| | 24CS0723 | Software Engineering | 3-0-0-0 | | 3 |
| | 24CS0724 | Computer Networks | 3-0-0-0 | | 3 |
| | 24CS0725 | Web 3.0 And Block Chain | 3-0-0-0 | | 3 |
| | 24CS0726 | Data Mining | 3-0-0-0 | | 3 |
| | 24CS0727 | Database And Its Applications | 3-0-0-0 | | 3 |

HMC Elective

| Slot | Sl. No | Course Code | Courses |
|------|--------|-------------|---|
| I* | 1 | 24HUT704 | Project Management: Planning, Execution, Evaluation and Control |
| | 2 | 24HUM701 | Proficiency course in French. (MOOC) (B1 level) |
| | 3 | 24HUM702 | Proficiency Course in German (MOOC) (B1 Level) |
| | 4 | 24HUM703 | Proficiency Course in Spanish (MOOC) (B1Level) |
| | 5 | 24HUM704 | Introduction to Japanese Language and Culture (N5 level) (MOOC) |



EDUCATION IS DEDICATION

| EIGHT SEMESTER (January-June) | | | | | | | | | | | | |
|--------------------------------------|------|--|-------------|---|------------------|---|---|---|-------------|-----|--------------------|-------------------|
| Sl. No: | Slot | Course Code | Course Type | Course Title (Course Name) | Credit Structure | | | | Total Marks | | Credits | Hrs./Week |
| | | | | | L | T | P | R | CIA | ESE | | |
| 1 | A | 24CSE86N/ 24CSM86N | PE | PE-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 2 | O | 24CSO83N/ 24CSI83N/ 24CSO84N | OE/ILE | OE/ILE-3 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 40 | 60 | 3 | 3 |
| 3 | I* | 24HUT803/ 24HUM803 | HMC | Organizational Behavior and Business Communication (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 2 | 0 | 0 | 0 | 50 | 50 | 1 | 2 |
| 4 | P | 24CSP806/ 24CSN06/ 24CSJ806/ 24CSU806 | PS | Option 1: Major Project Option 2: Internship (4-6 Months) Option 3: Major Project Phase -II (For the students who have not opted for internship in S7/S8) Option 3: Start Up | 0 | 0 | 0 | 8 | 100 | 0 | 4 | 8 |
| | R/H | 24CSH8XX | VAC | Project: Honours Course | | | | | | | 4* | 4 |
| Total | | | | | | | | | | | 11/ 15* | 16/ 20 |

PROGRAM ELECTIVE 6: 24CSE86N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|----------|-------------|--|---------|----------|----------|
| B | 24CSE861 | Quantum Computing | 3-0-0-0 | 3 | 3 |
| | 24CSE862 | Next-Generation Networks | 3-0-0-0 | | 3 |
| | 24CSE863 | Software-Defined Networking (SDN) | 3-0-0-0 | | 3 |
| | 24CSE864 | Large language models | 3-0-0-0 | | 3 |
| | 24CSE865 | Dev-Sec Ops | 3-0-0-0 | | 3 |
| | 24CSE866 | Automotive Open System Architecture Essentials | 3-0-0-0 | | 3 |
| | 24CSE867 | Generative AI# | 3-0-0-2 | 5 | 5 |

OPEN ELECTIVE 3: 24CS083N

| Slot | Course Code | Courses | L-T-P-R | Hours | Credit |
|------|-------------|-----------------------------------|---------|-------|--------|
| 0 | 24CS0831 | Business Intelligence | 3-0-0-0 | 3 | 3 |
| | 24CS0832 | Essentials of Big Data Processing | 3-0-0-0 | | 3 |
| | 24CS0833 | Ethical Hacking | 3-0-0-0 | | 3 |
| | 24CS0834 | Cyber Forensics | 3-0-0-0 | | 3 |
| | 24CS0835 | Foundations of Cybersecurity | 3-0-0-0 | | 3 |
| | 24CS0836 | Natural language Processing | 3-0-0-0 | | 3 |
| | 24CS0837 | Edge Computing | 3-0-0-0 | | 3 |

Micro Specialization

| Micro Specialization Group ID | Specialization | Courses |
|-------------------------------|----------------------------------|---|
| G-I | Software Engineering and Testing | 24CSE521 Software Project Management |
| | | 24CSE 631 Software testing |
| | | 24CSE741 Formal Methods in Software Engineering |
| | | 24CSE866 Automotive Open System Architecture Essentials |

EDUCATION IS DEDICATION

| HMC Courses | | | | |
|----------------------|-----------------|--------------------|--|----------------|
| Sl. No: | Semester | Course Code | Course Area | Credits |
| 1 | S1/S2 | 24HUT107 | Communicative English | 2 |
| 2 | | 24HUT006 | Professional ethics and Sustainable Development | 2 |
| 3 | S3 | 24HUT005 | Engineering Economics | 2 |
| 4 | S5 | 24HUM506 | Constitution of India. (MOOC) | 1 |
| 5 | S7 | 24HUT70X | Elective (Project Management/Foreign Languages) | 2 |
| 6 | S8 | 24HUT803 | Organizational Behavior and Business Communication | 1 |
| Total Credits | | | | 10 |

| BSC Courses | | | | |
|----------------------|-----------------|--------------------|-----------------------------------|----------------|
| Sl. No: | Semester | Course Code | Course Area | Credits |
| 1 | S1 | 24MAT111 | Calculus & Linear Programming | 3 |
| 2 | S1/S2 | 24PHC112 | Physics for Information Science | 4 |
| 3 | | 24CYC012 | Engineering Chemistry | 4 |
| 4 | S2 | 24MAT211 | Linear Algebra | 3 |
| 5 | S3 | 24MAT311 | Discrete Mathematics & Statistics | 3 |
| 6 | S4 | 24MAT411 | Graph Theory | 3 |
| Total Credits | | | | 20 |

| ESC Courses | | | | |
|----------------------|-----------------|--------------------|---|----------------|
| Sl. No: | Semester | Course Code | Course Area | Credits |
| 1. | S1 | 24EST003 | Engineering Graphics | 3 |
| 2. | | 24EST104 | Foundations of Computing | 3 |
| 3. | | 24ESR105 | Algorithmic Thinking with Python | 4 |
| 4. | | 24ESL007 | Computer Aided Drawing (CAD) & Manufacturing Workshop | 1 |
| 5. | S2 | 24EST104 | Fundamentals of Electrical & Electronics Engineering | 4 |
| 6. | | 24ESC204 | Programming in C | 4 |
| 7. | | 24ESL006 | Basic Electrical and Electronics Engineering Workshop | 1 |
| 8. | S3 | 24EST315 | Computer Organization and Architecture | 4 |
| 9. | S6 | 24EST605 | Design Thinking and Product Development | 2 |
| Total Credits | | | | 26 |

| Programme Core Courses(PCC) | | | | |
|--|-----------|-------------|--------------------------------------|-----------|
| Sl. No: | Semester | Course Code | Course Area | Credits |
| 1. | S3 | 24CST302 | Theory of Computation | 4 |
| 2. | | 24CST303 | Data Structures and Algorithms | 4 |
| 3. | | 24CSL306 | Data Structure Lab | 2 |
| 4. | | 24CSL307 | Hardware Lab | 2 |
| 5. | S4 | 24CST402 | Operating System | 4 |
| 6. | | 24CST403 | Design and Analysis of Algorithms | 4 |
| 7. | | 24CSL207 | Operating System Lab | 2 |
| 8. | | 24CSL208 | Database Management System Lab | 2 |
| 9. | S5 | 24CST501 | Computer Networks | 4 |
| 10. | | 24CST502 | Software Engineering | 4 |
| 11. | | 24CST503 | Machine Learning | 3 |
| 12. | | 24CSL507 | Machine Learning Lab | 2 |
| 13. | | 24CSL507 | Computer Networks Lab | 2 |
| 14. | S6 | 24CST601 | Compiler Design | 4 |
| 15. | | 24CST602 | High Performance Computing Systems | 3 |
| 16. | | 24CSC604 | Computer Vision and image Processing | 4 |
| 17. | | 24CSL607 | Systems Lab | 2 |
| Total Credits (Theory -10, Lab-7) | | | | 52 |

| Programme Core-Project Based Learning (PBL) | | | | |
|--|-----------|-------------|-----------------------------------|-----------|
| Sl. No: | Semester | Course Code | Course Area | Credits |
| 1 | S2 | 24CSR205 | Digital System Design | 4 |
| 2 | S3 | 24CSR304 | Object Oriented Programming | 4 |
| 3 | S4 | 24CSR404 | Database Management System | 4 |
| 4 | S5 | 24CSR504 | Data Science and Data Engineering | 4 |
| Total Credits | | | | 16 |

| Programme Elective Courses (PE) | | | | |
|--|-----------|-------------|--|-----------|
| Sl. No: | Semester | Course Type | | Credits |
| 1 | S4 | PE-1 | | 3 |
| 2 | S5 | PE-2 | | 3 |
| 3 | S6 | PE-3 | | 3 |
| 4 | S7 | PE-4 | | 3 |
| 5 | | PE-5 | | 3 |
| 6 | S8 | PE-6 | | 3 |
| Total Credits | | | | 18 |

| Open Elective Courses/Industry Elective(OE/IEL) | | | | |
|---|-----------|-------------|--|----------|
| Sl. No: | Semester | Course Type | | Credits |
| 1 | S6 | OE/ILE-1 | | 3 |
| 2 | S7 | OE/ILE-2 | | 3 |
| 3 | S8 | OE/ILE-3 | | 3 |
| Total Credits | | | | 9 |

| Project Work/Seminar | | | | |
|-----------------------------|-----------------|--|-----------------------------------|----------------|
| Sl. No: | Semester | Course Code | Course Type | Credits |
| 1 | S6 | 24CSP608 | Mini Project | 2 |
| 2 | S7 | 24CSS705 | Seminar | 2 |
| 3 | S7 | 24CSP706/ 24CSN706/ 24CSU706 | Major Project/Internship/Start-Up | 4 |
| 4 | S8 | 24CSP806/ 24CSN06/ 24CSJ806/ 24CSU706 | Major Project/Internship/Start-Up | 4 |
| Total Credits | | | | 12 |

| UHV and Community Work | | | |
|-------------------------------|--------------------|--------------------------------------|----------------|
| Semester | Course Code | Course Area | Credits |
| S4 | 24PWT206 | UHV II, Life Skills & Community Work | 1 |
| Total Credits | | | 1 |

| Skill Enhancement Course | | | | |
|---------------------------------|-----------------|--------------------|--------------------------|----------------|
| Sl. No | Semester | Course Code | Course Area | Credits |
| 1 | S1-S5 | 24SEK10N | Skill Enhancement Course | 5 |
| Total Credits | | | | 5 |

| Mandatory Student Activities | | | | |
|-------------------------------------|-----------------|--------------------|------------------------------|----------------|
| Sl. No | Semester | Course Code | Course Area | Credits |
| 1 | - | - | Mandatory Student Activities | 2 |
| Total Credits | | | | 2 |

| | | | | |
|----------------------|--|--|--|------------|
| Total Credits | | | | 170 |
|----------------------|--|--|--|------------|

RULES FOR ASSIGNING ACTIVITY POINTS

Apart from technical knowledge and skills, students should have excellent soft skills, leadership qualities and team spirit to be successful as professionals. They should have entrepreneurial capabilities and societal commitment. Student activity points to be earned, covering extracurricular and co-curricular activities, have been specified to nurture these qualities. All students must earn at least 100 activity points from various activity segments listed to qualify for the B.Tech degree. Two credits are given for this on a pass/ fail basis, which is mandatory for getting the B.Tech Degree. As no grade for these two credits is given, they are not included in the CGPA calculation. For lateral entry students joining from the third semester, the activity point requirement is 75 Points earned by the student, which will be indicated in the consolidated academic statement. In the case of NSS and NCC, points can be entered after completing a two-year Programme. All documental proof for awarding the activity points should be obtained, and the points will be consolidated. The rules for assigning activity points are given in the following sections.

The following table lists the main activity segments and the maximum points associated with each segment.

| Activity Points | | | | |
|-----------------|-------|---|---------------------|--|
| Sl. No. | Group | Courses | Credits | Minimum Credit Requirements |
| 1 | I | NSS, NCC, NSO (National Sports Organization) | 1 (50 Points) | 2 Credits (One credit from each Group) |
| 2 | | Arts/Sports/Games | | |
| 3 | | Union/Club Activities | | |
| 4 | II | English Proficiency Certification (TOFEL, IELTS, BEC etc.) | 1 (50 Points) | |
| 5 | | Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/Valid Gate Score | | |
| 6 | | Short Term Internship, Clinical Exposure/Training (Minimum 2 weeks), Conferences/Paper Presentation/ Workshop Activities/ Professional Body Activities/ MOOC Courses/ Entrepreneurship and Innovation | | |

- **75% per group for B. Tech Lateral Entry Students**
- **To obtain the 2 Activity Credits required in the curriculum, students must acquire at least 100 activity points.**

The following table lists the activities under each of these segments, the expected level of achievement, activity points, the evidence needed to assign the points, and the minimum duration required for certain activities. Additional activities under these segments can be considered after approval from the Academic Council.

| Group | Activity Head | Sl. No | Activity *Level | Achievement Levels and Assigned Activity Points | | | | | ** Approval Document | Max. Points | Min. duration of activity |
|----------------|---|--|--------------------|---|------------------------------|--------------|------------------|----|--|-------------|---------------------------|
| | | | | I | II | III | IV | V | | | |
| GROUP I | National Initiatives Participation | 1. | NCC | - | - | - | - | - | a/b | 50 | 2 Year |
| | | 2. | NSS | - | - | - | - | - | a/b | 50 | 2 Year |
| | | For a C certificate / outstanding performance supported by certification, additional marks up to 20 can be provided, subject to a maximum limit of 80 points. Best NSS Volunteer Awardee (University level) / Participation in National Integration Camp/ Pre-Republic Day Parade Camp (South India), supported by certification, additional marks up to 10 can be provided, subject to a maximum limit of 70 points. For the best NSS Volunteer Awardee (State / National level), Participation in Republic Day Parade Camp or International Youth Exchange Programme supported by certification, additional marks up to 20 can be provided, subject to a maximum limit of 80 points. | | | | | | | | | |
| | Sports & Games Participation | 3. | Sports | 5 | 10 | 20 | 30 | 50 | a | 50 | 1 Year |
| | | 4. | Games | 5 | 10 | 20 | 30 | 50 | a | 50 | 1 Year |
| | | | First Prize | 8 | 8 | 8 | 15 | 15 | Additional points can be provided for winning. The maximum limit for activity points is 60. However, the maximum point limit is enhanced to 80 for Level IV and V winning. | | |
| | | | Second Prize | 5 | 5 | 5 | 12 | 12 | | | |
| | | | Third Prize | 3 | 3 | 3 | 9 | 9 | | | |
| | | | | | | | | | | | |
| | Cultural Events | 5. | Music | 5 | 10 | 20 | 30 | 50 | a | 50 | 1 Year |
| | | 6. | Performing arts | 5 | 10 | 20 | 30 | 50 | a | 50 | 1 Year |
| | | 7. | Literary arts | 5 | 10 | 20 | 30 | 50 | a | 50 | 1 Year |
| | | | First Prize | 8 | 8 | 8 | 15 | 15 | Additional points can be provided for winning. The maximum limit for activity points is 60. But for Level IV and V winning, the maximum point limit is enhanced to 80. | | |
| | | | Second Prize | 5 | 5 | 5 | 12 | 12 | | | |
| | | | Third Prize | 3 | 3 | 3 | 9 | 9 | | | |
| | | | | | | | | | | | |
| | Union/Club Activities | | | Coordinator | Sub/joint-coordinator | | Volunteer | | | | |
| 8. | | Elected student representatives | 25 (Chairman) | 20 (Secretary) | | 10 (Members) | | d | 50 | 1 Year | |
| 9. | | Hobby Clubs | 10 | 5 | | 3 | | d | 30 | 1 Year | |

| | | | | | | | | | | |
|-----------------|--|-----|--|--|-----------|------------|-----------|----------|--------|----|
| | | 10. | Placement Activities | 10 | 5 | 3 | d | 30 | 1 Year | |
| | | 11. | Student Professional Societies (IEEE, IET, ASME, SAE, NASA etc.) | 10 | 5 | 3 | d | 30 | 1 Year | |
| | | 12. | Department Associations | 10 | 5 | 3 | d | 30 | 1 Year | |
| | | 13. | Festival & Technical Events (College approved) | 10 | 5 | 3 | d | 30 | 1 Year | |
| GROUP II | 14. Professional Self Initiatives | | Activity | Achievement Levels and Assigned Activity Points | | | | | | |
| | | | *Level | I | II | III | IV | V | | |
| | | 14. | Tech Fest, Tech Quiz | 10 | 20 | 30 | 40 | 50 | a | 40 |
| | | 15. | MOOC with final assessment certificate (Other than specified in the curriculum) | 30 | | | | | a | 40 |
| | | 16. | Competitions conducted by Professional Societies - (IEEE, IET, ASME, SAE, NASA etc.) | 5 | 10 | 15 | 20 | 30 | a | 30 |
| | | | Hackathon | 5 | 10 | 15 | 20 | 30 | a | 30 |
| | | 17. | Additional 10 points for Winners of Smart India Hackathon (SIH)/ India Innovation Challenge Design Contest (IICDC) | | | | | | | |
| | | 18. | Attending Full time Conference/ Seminars / Exhibitions/ Workshop/ STTP conducted at IITs /NITs | 10 | | | | | a | 20 |
| | | 18a | Attending Full time Conference/ Seminars / Exhibitions/ Workshop/ STTP conducted at KTU or its affiliated institutes | 4 | | | | | a | 8 |
| | | 19. | Paper presentation/ | 15 | | | | | a | 30 |

| | | | | | | |
|--|-------|---|----|--------|----|--|
| | | publication at IITs/NITs | | | | |
| | | Additional 10 points for certificate of recognition. | | | | |
| | 19. a | Paper presentation/ publication at KTU or its affiliated institutes | 6 | a | 12 | |
| | | Additional 2 points for a certificate of recognition. | | | | |
| | 20. | Poster Presentation at IITs /NITs | 8 | a | 15 | |
| | | Additional 10 points for certificate of recognition. | | | | |
| | 20.a | Poster Presentation at KTU or its affiliated institutes | 3 | a | 5 | |
| | | Additional 2 points for a certificate of recognition. | | | | |
| | 21. | Industrial Training/ Internship (at least for 2 weeks) | 15 | a/b | 15 | |
| | 22. | Industrial/ Exhibition visits | 3 | a/b/ d | 8 | |
| | 23. | Foreign Language Skills (TOEFL/ IELTS/ BEC exams, etc.) | 40 | a | 40 | |
| | 24. | Aptitude Proficiency Certification (GRE, CAT, GMAT, etc)/Valid Gate Score | 40 | a | 40 | |
| | 25. | Skilling Certificates (if not considered as part of the curriculum) | 25 | a | 25 | |
| Entrepreneurship and Innovation | 26. | Start-up Company Registered Legally (if not considered as part of the curriculum) | 50 | d | 50 | |
| | 27. | Patent-Filed | 25 | d | 25 | |
| | 28. | Patent - Published | 30 | d | 50 | |
| | 29. | Patent- Granted (if Grace marks are not awarded) | 40 | d | 50 | |
| | 30. | Patent- Licensed | 70 | d | 70 | |

| | | | | | | |
|--|-----|---|----|---|----|--|
| | 31. | Prototype developed and tested | 50 | d | 50 | |
| | 32. | Awards for Products developed | 50 | d | 50 | |
| | 33. | Innovative technologies developed and used by industries/users | 50 | d | 50 | |
| | 34. | Got venture capital funding for innovative ideas/products. | 70 | d | 70 | |
| | 35. | Startup Employment (Offering jobs to two persons not less than Rs. 15000/- per month) | 70 | d | 70 | |
| | 36. | Societal innovations | 40 | d | 40 | |

*Level I College Events

*Level II Zonal Events

*Level III State/ University Events

*Level IV National Events

*Level V International Events

**Approval Documents: (a) Certificate (b) Letter from Authorities (c) Appreciation recognition letter (d) Documentary evidence (e) Legal Proof (f) Others (specify)

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