# APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

(A State Government University)

# B. Tech Curriculum-2024

## Semester I to VIII

## Computer Science and Engineering (Data Science)

**Branch Code: CD**

**(Group A)**

**Ambady Nagar, Sreekaryam**

**Thiruvananthapuram- 695016**

| FIRST SEMESTER (July-December): Group A | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10 Days Compulsory Induction Program and UHV** | | | | | | | | | | | | | | |
| **Sl. No:** | **Slot** | **Course Code** | **Course Type** | **Course Category** | **Course Title (Course Name)** | **Credit Structure** | | | | **SS** | **Total Marks** | | **Credits** | **Hrs./ Week** |
| | | | | | | **L** | **T** | **P** | **R** | | **CIA** | **ESE** | | |
| 1 | A | GAMAT101 | BSC | GC | Mathematics for Information Science-1 | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 2 | B S1/ S2 | GAPHT121 | BSC | GC | Physics for Information Science | 3 | 0 | 2 | 0 | 5.5 | 40 | 60 | 4 | 5 |
| | | GXCYT122 | | | Chemistry for Information Science | | | | | | | | | |
| 3 | C | GMEST103 | ESC | GC | Engineering Graphics and Computer Aided Drawing. | 2 | 0 | 2 | 0 | 4 | 40 | 60 | 3 | 4 |
| 4 | D | GXEST104 | ESC | GC | Introduction to Electrical & Electronics Engineering (part 1: Electrical Engineering) | 2 | 0 | 0 | 0 | 3 | 20 | 30 | 2+2=4 | 4 |
| | | | | | (Part 2: Electronics Engineering) | 2 | 0 | 0 | 0 | 3 | 20 | 30 | | |
| 5 | F | UCEST105 | ESC | UC | Algorithmic Thinking with Python | 3 | 0 | 2 | 0 | 5.5 | 40 | 60 | 4 | 5 |
| 6 | L | GYESL106 | ESC | GC | Basic Electrical and Electronics Engineering Workshop | 0 | 0 | 2 | 0 | 1 | 50 | 50* | 1 | 2 |
| 7 | I** S1/ S2 | UCHWT127 | HWP | UC | Health and Wellness | 1 | 0 | 1 | 0 | 0 | 50 | 0 | 1 | 2/3 |
| | | UCHUT128 | HMC | | Life Skills and Professional Communication | 2 | 0 | 1 | 0 | 3.5 | 100 | 0 | | |
| 8 | $S_1$/ $S_2$ | UCSEM129 | SEC | UC | Skill Enhancement Course: Digital 101(NASSCOM) | MOOC*** | | | | 2 | | | - | |
| **Total** | | | | | | | | | | **30/ 32** | | | **20** | **25/ 26** |
| **Bridge Course (Mathematics or Introduction to Computer Science) *:** **Total 15 Hrs.** | | | | | | | | | | | | | | |

| SECOND SEMESTER (January-June): Group A | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sl. No:** | **Slot** | **Course Code** | **Course Type** | **Course Category** | **Course Title (Course Name)** | **Credit Structure** | | | | **SS** | **Total Marks** | | **Credits** | **Hrs./ Week** |
| | | | | | | **L** | **T** | **P** | **R** | | **CIA** | **ESE** | | |
| 1 | A | GAMAT201 | BSC | GC | Mathematics for Information Science-2 | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 2 | B S1/ S2 | GAPHT121 | BSC | GC | Physics for Information Science | 3 | 0 | 2 | 0 | 5.5 | 40 | 60 | 4 | 5 |
| | | GXCYT122 | | | Chemistry for Information Science | | | | | | | | | |
| 3 | C | GXEST203 | ESC | GC | Foundations of Computing: From Hardware Essentials to Web Design | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 4 | D | GYEST204 | ESC | GC | Programming in C | 3 | 0 | 2 | 0 | 5.5 | 40 | 60 | 4 | 5 |
| 5 | E | PCCST205 | PC | PC | Discrete Mathematics | 3 | 1 | 0 | 0 | 5 | 40 | 60 | 4 | 4 |
| 6 | F | UCEST206 | ESC | UC | Engineering Entrepreneurship & IPR | 3 | 0 | 0 | 0 | 4.5 | 60 | 40 | 3 | 3 |
| 7 | I* S1/ S2 | UCHWT127 | HWP | UC | Health and Wellness | 1 | 0 | 1 | 0 | 0 | 50 | 0 | 1 | 2/3 |
| | | UCHUT128 | HMC | | Life Skills and Professional Communication | 2 | 0 | 1 | 0 | 3.5 | 100 | 0 | | |
| 8 | L | GXESL208 | ESC | GC | IT Workshop | 0 | 0 | 2 | 0 | 1 | 50 | 50* | 1 | 2 |
| | $S_1$/ $S_2$ | UCSEM129 | SEC | UC | Skill Enhancement Course: Digital 101(NASSCOM) | MOOC | | | | | | | 1 | |
| **Total** | | | | | | | | | | **34** | | | **24** | **27/ 28** |

- ***No Grade Points will be awarded for the MOOC course and I slot course.***

- L-T-P-R: Lecture-Tutorial-Practical-Project
- SS (Self Study) Hours= 1.5L+0.5 T+0.5P+R
- CIA: Continuous Internal Assessment, ESE: End Semester Examination

**Note:** *Physics, Chemistry, Health and Wellness & Life Skill and Professional Communication can be offered in both Semester 1 (S1) and Semester 2 (S2). Institutions are encouraged to guide approximately 50% of their branches to choose between Physics* ***or*** *Chemistry (Slot B) and Health and Wellness* ***or*** *Life Skill and Professional Communication (Slot I) in Semester 1.*

| **Digital 101 (NASSCOM)** | | |
|---|---|---|
| **Sl. No:** | **Technologies Covered** | **Hours** |
| 1 | Artificial intelligence and Big Data Analytics (AI/BDA) | 11 |
| 2 | Internet of Things (IoT) | 2.5 |
| 3 | Cyber Security | 2.5 |
| 4 | Block Chain | 2.5 |
| 5 | Robotic Process Automation | 1.5 |
| 6 | Augmented Reality and Virtual Reality (AR and VR) | 2.5 |
| 7 | Cloud Computing | 2.5 |
| 8 | 3 D Printing and Modelling | 2 |
| 9 | Web, Mobile Dev and Marketing | 2 |
| 10 | Responsible AI | 1 |
| | **Total Hours** | **30** |

***Skill Enhancement Course:*** *Digital 101 is an introductory Massive Open Online Course (MOOC) offered by NASSCOM. It is designed to provide students with foundational knowledge and skills in digital technologies, preparing them for further studies and careers in the digital domain. By incorporating the Digital 101 course into the curriculum, KTU ensures that all students gain valuable digital skills early in their academic journey, enhancing their readiness for advanced courses and future careers in technology.*

***Course Registration and Completion****:*

- *Students have the flexibility to register and complete the Digital 101 course either in their first semester (S1) or second semester (S2).*
- *The credit for this course (1 credit) will be officially recorded in the second semester grade card.*

| THIRD SEMESTER (July-December) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sl. No:** | **Slot** | **Course Code** | **Course Type** | **Course Category** | **Course Title (Course Name)** | **Credit Structure** | | | | **SS** | **Total Marks** | | **Credits** | **Hrs./ Week** |
| | | | | | | **L** | **T** | **P** | **R** | | **CIA** | **ESE** | | |
| 1 | A | GAMAT301 | BSC | GC | Mathematics for Information Science-3 | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 2 | B | PCCST302 | PC | PC | Theory of Computation | 3 | 1 | 0 | 0 | 5 | 40 | 60 | 4 | 4 |
| 3 | C | PCCST303 | PC | PC | Data Structures and Algorithms | 3 | 1 | 0 | 0 | 5 | 40 | 60 | 4 | 4 |
| 4 | D | PBCST304 | PC-PBL | PB | Object Oriented Programming | 3 | 0 | 0 | 1 | 5.5 | 60 | 40 | 4 | 4 |
| 5 | F | GAEST305 | ESC | GC | Digital Electronics & Logic Design | 3 | 1 | 0 | | 5 | 40 | 60 | 4 | 4 |
| 6 | G S3/S4 | UCHUT346 | HMC | UC | Economics for Engineers | 2 | 0 | 0 | 0 | 3 | 50 | 50 | 2 | 2 |
| | | UCHUT347 | | | Engineering Ethics and Sustainable Development | | | | | | | | | |
| 7 | L | PCCSL307 | PCL | PC | Data Structures Lab | 0 | 0 | 3 | 0 | 1.5 | 50 | 50 | 2 | 3 |
| 8 | Q | PCCDL308 | PCL | PC | Python and Statistical Modeling Lab | 0 | 0 | 3 | 0 | 1.5 | 50 | 50 | 2 | 3 |
| 9 | R/M | | VAC | | Remedial/Minor Course | 3 | 1 | 0 | 0 | 5 | | | 4* | 4* |
| **Total** | | | | | | | | | | **31/ 36** | | | **25/29*** | **27/31*** |
| **Bridge Course for Lateral Entry Students: Total 15 Hrs.** | | | | | | | | | | | | | | |

| FOURTH SEMESTER (January-June) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sl. No:** | **Slot** | **Course Code** | **Course Type** | **Course Category** | **Course Title (Course Name)** | **Credit Structure** | | | | **SS** | **Total Marks** | | **Credits** | **Hrs./ Week** |
| | | | | | | **L** | **T** | **P** | **R** | | **CIA** | **ESE** | | |
| 1 | A | GAMAT401 | BSC | GC | Mathematics for Information Science-4 | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 2 | B | PCCST402 | PC | PC | Database Management Systems | 3 | 1 | 0 | 0 | 5 | 40 | 60 | 4 | 4 |
| 3 | C | PCCST403 | PC | PC | Operating Systems | 3 | 1 | 0 | 0 | 5 | 40 | 60 | 4 | 4 |
| 4 | D | PBCST404 | PC-PBL | PB | Computer Organization and Architecture | 3 | 0 | 0 | 1 | 5.5 | 60 | 40 | 4 | 4 |
| 5 | E | PECDT41N | PE | PE | PE-1 | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 6 | G S3/S4 | UCHUT346 | HMC | UC | Economics for Engineers | 2 | 0 | 0 | 0 | 3 | 50 | 50 | 2 | 2 |
| | | UCHUT347 | | | Engineering Ethics and Sustainable Development | | | | | | | | | |
| 7 | L | PCCSL407 | PCL | PC | Operating Systems Lab | 0 | 0 | 3 | 0 | 1.5 | 50 | 50 | 2 | 3 |
| 8 | Q | PCCSL408 | PCL | PC | DBMS Lab | 0 | 0 | 3 | 0 | 1.5 | 50 | 50 | 2 | 3 |
| 9 | R/M/H | | VAC | | Remedial/Minor/Honours Course | 3 | 1 | 0 | 0 | 5 | | | 4* | 4* |
| **Total** | | | | | | | | | | **31/ 36** | | | **24/ 28*** | **26/ 30*** |

**Note:** *Economics for Engineers and Engineering Ethics and Sustainable Development shall be offered in both S3 and S4. Institutions can advise students belonging to about 50% of the number of branches in the Institution to opt for Economics for Engineers in S3 and Engineering Ethics &Sustainable Development in S4 and vice versa.*

# PROGRAM ELECTIVE I: PECDT41N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| E | PECST411 | Software Engineering | 3-0-0-0 | 3 | 3 |
| | PECDT412 | Foundations of Security in Computing | 3-0-0-0 | | 3 |
| | PECST413 | Functional Programming | 3-0-0-0 | | 3 |
| | PECST416 | Signals and Systems | 3-0-0-0 | | 3 |
| | PECST417 | Soft computing | 3-0-0-0 | | 3 |
| | PEADT418 | Microcontrollers | 3-0-0-0 | | 3 |
| | **PEADT415** | **Foundations of Pattern Recognition** | **3-0-0-0** | | **5/3** |
| | **PECST495** | **Advanced Data Structures** | **3-0-0-0** | | **5/3** |

***Note :*** *Level 5 courses in the B. Tech curriculum carry a total of 5 credits, consisting of 3 credits for the Programme Elective and 2 additional credits. The additional 2 credits shall be awarded only if the student meets the eligibility conditions specified in the B. Tech. -2024 regulations. If those conditions are not fulfilled, the student will receive only 3 credits for the course.*

| FIFTH SEMESTER (July-December) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sl. No:** | **Slot** | **Course Code** | **Course Type** | **Course Category** | **Course Title (Course Name)** | **Credit Structure** | | | | **SS** | **Total Marks** | | **Credits** | **Hrs./ Week** |
| | | | | | | **L** | **T** | **P** | **R** | | **CIA** | **ESE** | | |
| 1 | A | PCCST501 | PC | PC | Computer Networks | 3 | 1 | 0 | 0 | 5 | 40 | 60 | 4 | 4 |
| 2 | B | PCCST502 | PC | PC | Design and Analysis of Algorithms | 3 | 1 | 0 | 0 | 5 | 40 | 60 | 4 | 4 |
| 3 | C | PCCDT503 | PC | PC | Data Analytics | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 4 | D | PBCDT504 | PC-PBL | PB | Big Data Processing | 3 | 0 | 0 | 1 | 5.5 | 60 | 40 | 4 | 4 |
| 5 | E | PECDT52N | PE | PE | PE-2 | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 6 | I* | UCHUM506 | HMC | UC | Constitution of India (MOOC) | - | - | - | - | 2 | - | - | 1 | - |
| 7 | L | PCCSL507 | PCL | PC | Networks Lab | 0 | 0 | 3 | 0 | 1.5 | 50 | 50 | 2 | 3 |
| 8 | Q | PCCDL508 | PCL | PC | Data Analytics Lab | 0 | 0 | 3 | 0 | 1.5 | 50 | 50 | 2 | 3 |
| 9 | R/M/H | | VAC | | Remedial/Minor/Honours Course | 3 | 1 | 0 | 0 | 5 | | | 4* | 4* |
| | $S_5$/ $S_6$ | Industrial Visit (Maximum 12 Days are permitted, Not Exceeding more than 6 Working Days) /Industrial Training | | | | | | | | | | | | |
| **Total** | | | | | | | | | | **30/ 35** | | | **23/27*** | **24/28*** |

****No Grade Points will be awarded for the MOOC course and I slot course.***

***Industrial Training:***
*Students who are not participating in the industrial visit must attend industrial training during that period.*

# PROGRAM ELECTIVE 2: PECDT52N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| E | PECST521 | Software Project Management | 3-0-0-0 | 3 | 3 |
| | PECST522 | Artificial Intelligence | 3-0-0-0 | | 3 |
| | PECDT523 | Data Privacy and Security | 3-0-0-0 | | 3 |
| | PECST524 | Data Compression | 3-0-0-0 | | 3 |
| | PEADT526 | Computational Biology | 3-0-0-0 | | 3 |
| | PECST527 | Computer Graphics and Multimedia | 3-0-0-0 | | 3 |
| | PECST528 | Advanced Computer Architectures | 3-0-0-0 | | 3 |
| | **PECST525** | **Data Mining** | **3-0-0-0** | | **5/3** |
| | **PECST595** | **Advanced Graph Algorithms** | **3-0-0-0** | | **5/3** |

| SIXTH SEMESTER (January-June) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sl. No: | Slot | Course Code | Course Type | Course Category | Course Title (Course Name) | Credit Structure | | | | SS | Total Marks | | Credits | Hrs/ Week |
| | | | | | | L | T | P | R | | CIA | ESE | | |
| 1 | A | PCCST601 | PC | PC | Compiler Design | 3 | 1 | 0 | 0 | 5 | 40 | 60 | 4 | 4 |
| 2 | B | PCCDT602 | PC | PC | Machine Learning | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 3 | C | PECDT63N | PE | PE | PE-3 | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 4 | D | PBCDT604 | PC-PBL | PB | Data Visualization and Programming with R | 3 | 0 | 0 | 1 | 5.5 | 60 | 40 | 4 | 4 |
| 5 | F | GAEST605 | ESC | GC | Design Thinking and Product Development (Group Specific Syllabus) | 2 | 0 | 0 | 0 | 3 | 40 | 60 | 2 | 2 |
| 6 | O | OECDT61N /IECDT61N | OE/ILE | OE/IE | OE/ILE-1 | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 7 | L | PCCDL607 | PCL | PC | Big Data Processing Lab | 0 | 0 | 3 | 0 | 1.5 | 50 | 50 | 2 | 3 |
| 8 | P | PCCDP608 | PWS | PC | Mini Project: Socially Relevant Project | 0 | 0 | 0 | 3 | 3 | 50 | 50 | 2 | 3 |
| 9 | R/M/H | | VAC | | Remedial/Minor/Honours Course | 3 | 0 | 0 | 0 | 4.5 | | | 3* | 3* |
| | S5/S6 | Industrial Visit (Maximum of 12 Days are permitted, Not Exceeding more than 6 Working Days) /Industrial Training | | | | | | | | | | | | |
| **Total** | | | | | | | | | | **32/36** | | | **23/26*** | **25/28*** |

*Note: Open Electives are such courses which will be offered by other departments. Like CSE department students have to opt open electives from ECE/ME/EEE etc. departments.*

***Industrial Training:***
*Students who are not participating in the industrial visit must attend industrial training during that period.*

## PROGRAM ELECTIVE 3: PECDT63N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| **C** | PECST631 | Software Testing | 3-0-0-0 | **3** | 3 |
| | PECDT632 | Data Warehousing | 3-0-0-0 | | 3 |
| | PECDT633 | Basics of Robotics and Automation | 3-0-0-0 | | 3 |
| | PECDT634 | Cloud Computing | 3-0-0-0 | | 3 |
| | PECST636 | Digital Image Processing | 3-0-0-0 | | 3 |
| | PECST639 | Randomized Algorithms | 3-0-0-0 | | 3 |
| | **PECDT635** | **Web Mining** | **3-0-0-0** | | **5/3** |
| | **PECDT695** | **Deep Learning** | **3-0-0-0** | | **5/3** |

## OPEN ELECTIVE 1: OECDT61N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| **O** | OECST611 | Data Structures | 3-0-0-0 | 3 | 3 |
| | OECST612 | Data Communication | 3-0-0-0 | | 3 |
| | OECST613 | Foundations of Cryptography | 3-0-0-0 | | 3 |
| | OECST614 | Machine Learning for Engineers | 3-0-0-0 | | 3 |
| | OECST615 | Object Oriented Programming | 3-0-0-0 | | 3 |

| **SEVENTH SEMESTER (July-December)** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sl. No:** | **Slot** | **Course Code** | **Course Type** | **Course Category** | **Course Title (Course Name)** | **Credit Structure** | | | | **SS** | **Total Marks** | | **Credits** | **Hrs/ Week** |
| | | | | | | **L** | **T** | **P** | **R** | | **CIA** | **ESE** | | |
| 1 | A | PECDT74N/ PECDM74N | PE | PE | PE-4 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 2 | B | PECDT75N/ PECDM75N | PE | PE | PE-5 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 3 | O | OECDT72N/ IECDT72N/ OECDM72N | OE/ ILE | OE/IE | OE/ILE-2 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 4 | I* | UEHUT704/ UEHUM70N | HMC | UE | Elective (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 2 | 0 | 0 | 0 | 3 | 50 | 50 | 2 | 2 |
| 5 | S | PCCDS705 | PWS | PC | Seminar | 0 | 0 | 3 | 0 | 1.5 | 50 | 0 | 2 | 3 |
| 6 | P | PCCDP706/ PCCDI706 | PWS | PC | Option 1: Major Project Option 2: Internship (4-6 Months) | 0 | 0 | 0 | 8 | 8 | 100 | 0 | 4 | 8 |
| 7 | R/H | | VAC | | Remedial/Honours Course | 3 | 0 | 0 | 0 | 4.5 | | | 3* | 3* |
| **Total** | | | | | | | | | | **26/ 31** | | | **17/20*** | **22/25*** |

**No Grade Points will be awarded for the I slot courses*
**Students can opt for the internship either in the **7th or 8th semester.***
** Option 1: Work on a Project in the institute/department under the mentorship of faculty members.*
*Option 2: Full semester Internship in an Industry/organization (**7th or 8th semester**)*

Note: Open Electives are such courses which will be offered by other departments.

## PROGRAM ELECTIVE 4: PECDT74N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| A | PECDT741 | Recommendation Systems | 3-0-0-0 | 3 | 3 |
| | PECDT742 | Financial Data Science | 3-0-0-0 | | 3 |
| | PECDT743 | Foundations of Computer Vision | 3-0-0-0 | | 3 |
| | PECST742 | Web Programming | 3-0-0-0 | | 3 |
| | PECST743 | Bioinformatics | 3-0-0-0 | | 3 |
| | PECST747 | Blockchain and Cryptocurrencies | 3-0-0-0 | | 3 |
| | **PECDT745** | **Information Retrieval** | **3-0-0-0** | | **5/3** |
| | **PECDT795** | **Advanced Database Systems** | **3-0-0-0** | | **5/3** |

## PROGRAM ELECTIVE 5: PECDT75N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| B | PECDT751 | Graph Databases and Analysis | 3-0-0-0 | 3 | 3 |
| | PECDT752 | Introduction to Internet of Things | 3-0-0-0 | | 3 |
| | PECDT753 | Mobile Applications | 3-0-0-0 | | 3 |
| | PECST752 | Responsible Artificial Intelligence | 3-0-0-0 | | 3 |
| | PECST754 | Digital Forensics | 3-0-0-0 | | 3 |
| | PECST757 | High Performance Computing | 3-0-0-0 | | 3 |
| | PECST759 | Parallel Algorithms | 3-0-0-0 | | 3 |
| | **PECDT755** | **Reinforcement Learning** | **3-0-0-0** | **3** | **5/3** |

## OPEN ELECTIVE 2: OECDT72N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| O | OECST721 | Cyber Security | 3-0-0-0 | 3 | 3 |
| | OECST722 | Cloud Computing | 3-0-0-0 | | 3 |
| | OECST723 | Software Engineering | 3-0-0-0 | | 3 |
| | OECST724 | Computer Networks | 3-0-0-0 | | 3 |
| | OECST725 | Mobile Application Development | 3-0-0-0 | | 3 |

| Slot I: HMC Elective | |
|---|---|
| 1 | Project Management: Planning, Execution, Evaluation and Control |
| 2 | Proficiency course in French. (MOOC) (B1 level) |
| 3 | Proficiency Course in German (B1 Level). (MOOC) |
| 4 | Proficiency Course in Spanish (B1 Level) (MOOC) |
| 5 | Introduction to Japanese Language and Culture (N5 level). (MOOC) |

| EIGHTH SEMESTER (January-June) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sl. No: | Slot | Course Code | Course Type | Course Category | Course Title (Course Name) | Credit Structure | | | | SS | Total Marks | | Credits | Hrs/ Week |
| | | | | | | L | T | P | R | | CIA | ESE | | |
| 1 | A | PECDT86N/ PECDM86N | PE | PE | PE-6 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 2 | O | OECDT83N/ IECDT83N/ OECDM83N | OE/ILE | OE/IE | OE/ILE-3 (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 3 | 0 | 0 | 0 | 4.5 | 40 | 60 | 3 | 3 |
| 3 | I* | UEHUT803/ UEHUM803 | HMC | UC | Organizational Behavior and Business Communication (Internship Students: Self Study/MOOC Approved by the University/Online Classes) | 2 | 0 | 0 | 0 | 3 | 50 | 50 | 1 | 2 |
| 4 | P | PCCDP806/ PCCDI806/ PCCDJ806 | PWS | PC | Option 1: Major Project<br>Option 2: Internship (4-6 Months)<br>Option 3: Major Project Phase -II<br>(For the students who have not opted for internship in S7/S8) | 0 | 0 | 0 | 8 | 8 | 100 | 0 | 4 | 8 |
| **Total** | | | | | | | | | | **20** | | | **11** | **16** |

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

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

## PROGRAM ELECTIVE 6: PECDT86N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| A | PECDT861 | Time Series Modeling and Analysis | 3-0-0-0 | 3 | 3 |
| | PECDT862 | Healthcare Data Analytics | 3-0-0-0 | | 3 |
| | PECDT863 | Social Network Analysis | 3-0-0-0 | | 3 |
| | PECST862 | Natural Language Processing | 3-0-0-0 | | 3 |
| | PECST866 | Speech and Audio Processing | 3-0-0-0 | | 3 |
| | PECST867 | Storage Systems | 3-0-0-0 | | 3 |
| | PECST868 | Prompt Engineering | 3-0-0-0 | | 3 |
| | **PECST865** | **Next Generation Interaction Design** | **3-0-0-0** | **3** | **5/3** |

# OPEN ELECTIVE 3: OECDT83N

| SLOT | COURSE CODE | COURSES | L-T-P-R | HOURS | CREDIT |
|---|---|---|---|---|---|
| O | OECST831 | Introduction to Algorithms | 3-0-0-0 | 3 | 3 |
| | OECST832 | Web Programming | 3-0-0-0 | | 3 |
| | OECST833 | Software Testing | 3-0-0-0 | | 3 |
| | OECST834 | Internet of Things | 3-0-0-0 | | 3 |
| | OECST835 | Computer Graphics | 3-0-0-0 | | 3 |

| HMC Courses | | | |
|---|---|---|---|
| **Sl. No:** | **Semester** | **Course Area** | **Credits** |
| 1 | **S1/S2** | Life Skills and Professional Communication | 1 |
| 2 | **S3/S4** | Economics for Engineers | 2 |
| 3 | | Engineering Ethics and Sustainable Development | 2 |
| 4 | **S5** | Constitution Of India. (MOOC) | 1 |
| 5 | **S7** | Elective (Project Management/Foreign Languages) | 2 |
| 6 | **S8** | Organizational Behavior and Business Communication | 1 |
| **Total Credits** | | | **9** |

| BSC Courses | | | |
|---|---|---|---|
| **Sl. No:** | **Semester** | **Course Area** | **Credits** |
| 1 | **S1** | Group Specific Mathematics-1 | 3 |
| 2 | **S1/S2** | Physics for Engineers | 4 |
| 3 | | Chemistry for Engineers | 4 |
| 4 | **S2** | Group Specific Mathematics-2 | 3 |
| 5 | **S3** | Group Specific Mathematics-3 | 3 |
| 6 | **S4** | Group Specific Mathematics-4 | 3 |
| **Total Credits** | | | **20** |

| ESC Courses (Group A) | | | |
|---|---|---|---|
| **Sl. No:** | **Semester** | **Course Area** | **Credits** |
| 1 | **S1** | Engineering Graphics and Computer Aided Drawing | 3 |
| 2 | | Introduction to Electrical and Electronics Engineering | 4 |
| 3 | | Algorithmic Thinking with Python | 4 |
| 4 | | Basic Electrical and Electronics Engineering Workshop | 1 |
| 5 | **S2** | Foundations of Computing: From Hardware Essentials to Web Design | 3 |
| 6 | | Programming in C | 4 |
| 7 | | Engineering Entrepreneurship and IPR | 3 |
| 8 | | IT Workshop | 1 |
| 9 | **S3** | Introduction to Artificial Intelligence and Data Science | 4 |
| 10 | **S6** | Design Thinking and Product Development | 2 |
| **Total Credits** | | | **29** |

| Programme Core Courses (PC) | | | |
|---|---|---|---|
| **Sl. No:** | **Semester** | **Course Area** | **Credits** |
| 1 | **S2** | Core 1 | 4 |
| 2 | **S3** | Core 2 | 4 |
| 3 | | Core 3 | 4 |
| 4 | | Lab-1 | 2 |
| 5 | | Lab-2 | 2 |
| 6 | **S4** | Core 4 | 4 |
| 7 | | Core 5 | 4 |
| 8 | | Lab-3 | 2 |
| 9 | | Lab-4 | 2 |
| 10 | **S5** | Core 6 | 4 |
| 11 | | Core 7 | 4 |
| 12 | | Core 8 | 3 |
| 13 | | Lab-5 | 2 |
| 14 | | Lab-6 | 2 |
| 15 | **S6** | Core 9 | 4 |
| 16 | | Core 10 | 3 |
| 17 | | Lab-7 | 2 |
| **Total Credits (Theory -10, Lab-7)** | | | **52** |

| Programme Core-Project Based Learning (PBL) | | | |
|---|---|---|---|
| **Sl. No:** | **Semester** | **Course Area** | **Credits** |
| 1 | **S3** | Core PBL-1 | 4 |
| 2 | **S4** | Core PBL-2 | 4 |
| 3 | **S5** | Core PBL-3 | 4 |
| 4 | **S6** | Core PBL-4 | 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/ Internship and Seminar | | | |
|---|---|---|---|
| **Sl. No:** | **Semester** | **Course Type** | **Credits** |
| 1 | **S6** | Mini Project | 2 |
| 2 | **S7** | Seminar | 2 |
| 3 | | Major Project/Internship | 4 |
| 4 | **S8** | Major Project/Internship/Research Project | 4 |
| **Total Credits** | | | **12** |

| Activity Points | | | | |
|---|---|---|---|---|
| **Sl. No.** | **Group** | **Courses** | **Credits** | **Minimum Credit Requirements** |
| 1 | I | NSS, NCC, NSO (National Sports Organization) | 1 (40 Points) | 3 Credits (One credit from each Group) |
| 2 | | Arts/Sports/Games | | |
| 3 | | Union/Club Activities | | |
| 4 | II | English Proficiency Certification (TOFEL, IELTS, BEC etc.) | 1 (40 Points) | |
| 5 | | Aptitude Proficiency Certification (GRE, CAT, GMAT etc.)/ Valid Gate Score. | | |
| 6 | | Short Term Internship (Minimum 2 weeks), Clinical Exposure/Training (Minimum 2 weeks), Conferences/Paper Presentation/ Workshop Activities/ Professional Body Activities, Participation in University level/State Level/ National Level Hackathons | | |
| 7 | III | Journal Publication, Patents, Start-Up, Innovation, Winners of National/ International Level Hackathons | 1 (40 Points) | |
| 8 | | **Skilling Certificates** (Approved by the University) | | |

- ***Students are required to acquire a minimum of 120 activity points, with at least 40 points per group, to fulfill the curriculum requirement of 3 activity credits.***
- ***For B. Tech Lateral Entry students, 30 points per group are required. A minimum of 90 activity points must be acquired to obtain the 3 activity credits mandated by the curriculum.***

| *Course classifications of the B. Tech Programmes and Overall Credit Structure* | | | |
|---|---|---|---|
| **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 | 29 |
| 4 | Programme (Professional) Core Courses | PCC | 52 |
| 5 | Programme (Professional) Core Courses-Project Based Learning | PBL | 16 |
| 6 | Programme Elective Courses | PEC | 18 |
| 7 | Open Elective Courses/Industry Linked Elective | OEC/ILE | 9 |
| 8 | Mini Project,Project Work/Internship and Seminar | PWS | 12 |
| 9 | Health and Wellness | HWP | 1 |
| 10 | Skill Enhancement Courses (Digital 101) | SEC | 1 |
| 11 | Mandatory Student Activities | MSA | 3 |
| **Total Credits** | | | **170** |