# SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE

**(Autonomous)**

**Gobichettipalayam, Erode -638455**

## Regulation 2025 (Autonomous)

## Curriculum and Syllabus

## Choice Based Credit System(CBCS)

## B.E. Computer Science and Engineering (Cyber Security)

# SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
**(Autonomous)**
**Gobichettipalayam, Erode -638455**

**Regulation 2025 (UG)**
**Curriculum and Syllabus**
**B.E.-Computer Science and Engineering (Cyber Security)**

## I. Program Educational Objective (PEO)

**PEO1 : Technical Skills:** Apply their technical competence in computer science to solve real world problems, with technical and people leadership

**PEO2 : Problem Solving Skills:** Conduct cutting edge study and develop solutions on problems of social relevance.

**PEO3 : Professional Skills:** Work in a business environment, exhibiting team skills, work ethics, adaptability and lifelong learning

## II. Program Outcomes (POs)

**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 to the solution of complex engineering problems.

**PO2: Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

**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)

**PO4: Conduct Investigations of Complex Problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modeling, analysis & interpretation of data to provide valid conclusions. (WK8).

**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)

**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).

**PO7: Ethics:** Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

**PO8: Individual and Collaborative Teamwork:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

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**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

**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.

**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)

## III. Program Specific Outcomes (PSOs)

**PSO 1 : Technological Ability:** Exhibit design and programming skills to build and automate business solutions using cutting edge technologies.

**PSO 2 : Problem Solving Skill:** Strong theoretical and practical foundation leading to excellence and excitement towards problem solving, to provide elegant solutions to complex problems.

**PSO 3 : Application Development:** Ability to work effectively with various engineering fields as a team to design, build and develop system applications.

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## Mapping of Course Outcome and Programme Outcome

| Year | Sem | Course name | PO | | | | | | | | | | | PSO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 1 | 2 | 3 |
| I | I | Induction Programme | | | | | | | 1 | 3 | 3 | - | 2 | 1 | 1 | 1 |
| | | Communicative English - I | - | - | - | 1 | - | 1 | - | 2 | 3 | - | 3 | - | - | - |
| | | Matrices and Calculus | 3 | 3 | 2 | 1 | - | - | - | 2 | - | 2 | 3 | 2 | 2 | - |
| | | Engineering Physics | 3 | 3 | 2 | 1 | 2 | - | - | - | - | - | 1 | 3 | 2 | 2 |
| | | Engineering Chemistry | 3 | 2 | 2 | 1 | 1 | 2 | - | - | - | 2 | 2 | - | - | 1 |
| | | Problem Solving Using C Programming | 2 | 3 | 3 | 3 | 2 | - | - | - | 1 | - | - | 3 | 3 | 3 |
| | | Heritage of Tamils | - | - | - | - | - | 1 | 1 | 2 | 2 | 2 | 2 | - | - | - |
| | | Idea Lab | 3 | 2 | 3 | 2 | 2 | - | - | - | - | - | - | 2 | 2 | 2 |
| | | Mandatory Course - I Yoga for Human Excellence | - | - | - | - | - | - | - | 2 | 3 | - | 2 | - | - | - |
| | II | Communicative English - II | - | 1 | 1 | - | - | - | 1 | 2 | - | 2 | 3 | 1 | 1 | - |
| | | Numerical Methods and Differential Equations | 3 | 3 | 2 | 1 | 1 | - | 2 | - | - | 2 | 3 | 2 | 2 | 1 |
| | | Physics for Information Science | 3 | 1 | 2 | 1 | 2 | 1 | 1 | - | - | - | - | 3 | 3 | 2 |
| | | Basic Electrical and Electronics Engineering | 3 | 3 | 2 | 2 | - | - | - | - | 3 | - | 2 | 3 | 3 | 2 |
| | | Engineering Graphics | 3 | 1 | 2 | - | 2 | - | - | 0 | 3 | 0 | 2 | 2 | 2 | - |
| | | Python Programming | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 3 | 3 |
| | | Tamils and Technology | 2 | - | - | - | - | 2 | 2 | 2 | 2 | - | 2 | - | - | - |
| | | Design Thinking Practices | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 2 |

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## Mapping of Course Outcome and Programme Outcome

| Year | Sem | Course name | PO | | | | | | | | | | | PSO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 1 | 2 | 3 |
| II | III | Discrete Mathematics and Computational Structures | 3 | 3 | 2 | 2 | - | - | - | 2 | - | - | - | - | - | 2 |
| | | Foundations of Cyber Security | 2 | 1.4 | 1.6 | 2 | 2.4 | - | - | 2 | 1.8 | 2.2 | 1.8 | 2 | 2.2 | 2 |
| | | Operating Systems | 2.2 | 2.2 | 1.8 | 2.2 | 1.3 | - | - | - | 2.2 | 1.6 | 1.6 | 1.4 | 1.4 | 1.6 |
| | | Data Structures | 1.6 | 2.2 | 1 | 1.8 | 2 | 1 | - | 1.2 | 1.4 | 1 | 2.4 | 2 | 1.8 | 2.2 |
| | | Java Programming | 2 | 1.4 | 2.2 | 2 | 2 | - | - | 2.4 | 1.8 | 1.2 | 2.4 | 3 | 1.8 | 2.2 |
| | | Digital Principles and Computer Organization | 3 | 3 | 3 | 3 | 1.8 | 1.6 | 1 | 1 | 1 | 1 | 1.6 | 1.4 | 2.6 | 1.6 |
| | | Mandatory Courses-II & | - | - | - | - | -- | - | - | - | - | - | - | - | - | - |
| | IV | Probability Theory and Statistical Methods | 3 | 3 | 1 | 1 | - | - | - | 2 | - | - | - | - | - | 3 |
| | | Digital Forensics | 2 | 2 | 1 | 2 | 2 | - | 1 | - | - | - | 2 | 2 | 2 | 2 |
| | | Standards in Computer Science | 2 | 1.6 | 2.6 | 2 | 1.3 | - | - | 2 | 2 | 2.2 | 2 | 2 | 1.8 | 2.6 |
| | | Object Oriented Software Engineering | 2 | 2.8 | 1.6 | 2 | 2 | - | - | 2 | 1.8 | 2.5 | 1.8 | 2.4 | 2.4 | 1.2 |
| | | Database Management Systems | 2 | 1.6 | 2.6 | 2 | 1.3 | - | - | 2 | 2 | 2.2 | 2 | 2 | 1.8 | 2.6 |
| | | Artificial Intelligence Essentials | 2 | 1 | 2 | 2 | 1 | - | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| | | Soft and Analytical Skills-I | 2.6 | 2.6 | - | 1 | - | - | - | 1 | 2.5 | 2.5 | - | - | - | - |
| | | Artificial Intelligence Laboratory | 2 | 1 | 2 | 2 | 1 | - | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| | | Mandatory Courses-III& | - | - | - | - | -- | - | - | - | - | - | - | - | - | - |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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# SUMMARY OF CREDITS

| S.No | Course Category | Credits per Semester | | | | | | | | Total Credits | Credits in % | Credits as per AU Curriculum R-2025 | Credits as per AICTE Model Curriculum 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | I | II | III | IV | V | VI | VII | VIII | | | | |
| 1 | BS | 11 | 6 | 4 | 3 | | 23 | | | 24 | 14.54 | 24 | 23 |
| 2 | HUM | 5 | 4 | | | | 16 | 6 | | 17 | 10.30 | 18 | 16 |
| 3 | ES(G) | | 8 | | | | 29 | | | 8 | 4.84 | 3 | 29 |
| 4 | ES(PC) | 4 | 4 | 20 | 16 | 17 | 59 | 4 | | 73 | 44.24 | 79 | 59 |
| 5 | ES(PE) | | | | | 3 | 12 | 6 | | 15 | 9.09 | 15 | 12 |
| 6 | OE | | | | | | | 3 | | 3 | 1.81 | 3 | |
| 7 | SL | | | | | | 9 | | | 1 | 0.60 | 1 | 9 |
| 8 | SD | 2 | 2 | | 1 | 3 | 2 | 3 | 10 | 24 | 14.54 | 21 | |
| 9 | MC | √ | | √ | √ | | | | | | | | |
| **Total Credits / Semester** | | **22** | **24** | **24** | **20** | **23** | **20** | **22** | **10** | **165** | **100** | **164** | **163** |

**CATEGORIZATION OF COURSES**

1. Basic Science (BS)
2. Humanities (HUM)
3. Engineering Science (ES)
   i. General(G)
   ii. Program Core(PC)
   iii. Programme Elective(PE)
   iv. Emerging Technology(ET)
4. Open Elective (OE)
5. Self Learning(SL)
6. Skill Development(SD)
7. Value Added Course (VA)
8. Off Campus (OC)
9. Mandatory Course(MC)

**ENROLLMENT FOR B.E. / B. TECH. (HONOURS) / MINOR DEGREE (OPTIONAL)**

A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E. / B. Tech. (Honours) or Minor Degree.

For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same vertical or a combination of different verticals of the same programme of study only.

For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular vertical from any one of the other programmes

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## Regulation 2025 (UG)
## Curriculum and Syllabus
## B.E.-Computer Science and Engineering(Cyber Security)

### SEMESTER I

| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | SDG Mapping | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | CA | ES | TM |
| **Induction Program** | | | | | | | | | | | | |
| 1. | 25IPA11 | Induction Programme | - | - | - | - | - | 0 | | - | - | - |
| **Theory** | | | | | | | | | | | | |
| 2. | 25ENI11 | Communicative English - I | HUM | 3 | 0 | 2 | 5 | 4 | 4,5,8, 9,16 | 50 | 50 | 100 |
| 3. | 25MAT11 | Matrices and Calculus | BS | 3 | 0 | 0 | 3 | 3 | 4,8,9, 11 | 40 | 60 | 100 |
| 4. | 25PHI11 | Engineering Physics | BS | 3 | 0 | 2 | 5 | 4 | 3,4,9, 11,12 | 50 | 50 | 100 |
| 5. | 25CYI11 | Engineering Chemistry | BS | 3 | 0 | 2 | 5 | 4 | 4,6,7 | 50 | 50 | 100 |
| 6. | 25CSI11 | Problem Solving Using C Programming | ES(PC) | 3 | 0 | 2 | 5 | 4 | 4,8,9, 10,17 | 50 | 50 | 100 |
| 7. | 25TAT11 | Heritage of Tamils | HUM | 1 | 0 | 0 | 1 | 1 | 3,4,8, 11,16 | 40 | 60 | 100 |
| **Practicals** | | | | | | | | | | | | |
| 8. | 25MEL11 | Idea Lab | SD | 0 | 0 | 4 | 4 | 2 | 4,8,9, 11,12 | 60 | 40 | 100 |
| **Mandatory Course** | | | | | | | | | | | | |
| 9. | 25MDC11 | Yoga for Human Excellence | MC | 0 | 0 | 1 | 1 | 0 | 3,4,5, 10,16 | 100 | - | 100 |
| | | | **Total** | **16** | **0** | **13** | **29** | **22** | | | | |

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## B.E.-Computer Science and Engineering(Cyber Security)

### SEMESTER II

| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | SDG Mapping | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | CA | ES | TM |
| **Theory** | | | | | | | | | | | | |
| 1. | 25ENI21 | Communicative English - II | HUM | 2 | 0 | 2 | 4 | 3 | 4,5,8, 9,16 | 50 | 50 | 100 |
| 2. | 25MAT21 | Numerical Methods and Differential Equations | BS | 3 | 0 | 0 | 3 | 3 | 4,8,9, 11 | 40 | 60 | 100 |
| 3. | 25PHT21 | Physics for Information Science | BS | 3 | 0 | 0 | 3 | 3 | 3,4,7, 8,9,11, 12,16 | 40 | 60 | 100 |
| 4. | 25EEI22 | Basic Electrical and Electronics Engineering | ES(G) | 3 | 0 | 2 | 5 | 4 | 4,7,9, 12 | 50 | 50 | 100 |
| 5. | 25CSI21 | Python Programming | ES(PC) | 3 | 0 | 2 | 5 | 4 | 4,8,9, 10,17 | 50 | 50 | 100 |
| 6. | 25MEI21 | Engineering Graphics | ES(G) | 3 | 0 | 2 | 5 | 4 | 4,8,9, 11 | 50 | 50 | 100 |
| 7. | 25TAT21 | Tamils and Technology | HUM | 1 | 0 | 0 | 1 | 1 | 2,4,6,9 ,11 | 40 | 60 | 100 |
| **Practicals** | | | | | | | | | | | | |
| 8. | 25CSL21 | Design Thinking Practices | SD | 0 | 0 | 4 | 4 | 2 | 4,8,9, 10 ,12, 13,17 | 60 | 40 | 100 |
| | | | **Total** | **18** | **0** | **12** | **30** | **24** | | | | |

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## B.E.-Computer Science and Engineering(Cyber Security)

### SEMESTER III

| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | SDG Mapping | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | CA | ES | TM |
| **Theory** | | | | | | | | | | | | |
| 1. | 25MAT31 | Discrete Mathematics and Computational Structures | BS | 3 | 1 | 0 | 4 | 4 | 4, 8, 9, 17 | 40 | 60 | 100 |
| 2. | 25CRI31 | Foundations of Cyber Security | ES(PC) | 3 | 0 | 2 | 5 | 4 | 4,8,9, 11 | 50 | 50 | 100 |
| 3. | 25CSI31 | Operating Systems | ES(PC) | 3 | 0 | 2 | 5 | 4 | 4, 8, 9, 12,17 | 50 | 50 | 100 |
| 4. | 25CSI32 | Data Structures | ES(PC) | 3 | 0 | 2 | 5 | 4 | 4, 8, 9, 12,17 | 50 | 50 | 100 |
| 5. | 25CSI33 | Java programming | ES(PC) | 3 | 0 | 2 | 5 | 4 | 4, 8, 9, 12,17 | 50 | 50 | 100 |
| 6. | 25ECI31 | Digital Principles and Computer Organization | ES(PC) | 3 | 0 | 2 | 5 | 4 | 4,8,9, 10,16 | 50 | 50 | 100 |
| **Mandatory Course** | | | | | | | | | | | | |
| 7. | | Mandatory Courses – II & | MC | 3 | 0 | 0 | 3 | 0 | | 100 | - | 100 |
| | | | **Total** | **21** | **1** | **10** | **32** | **24** | | | | |

**& Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-II)**

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### SEMESTER IV

| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | SDG Mapping | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | CA | ES | TM |
| **Theory** | | | | | | | | | | | | |
| 1. | 25MAT41 | Probability Theory and Statistical Methods | BS | 3 | 0 | 0 | 3 | 3 | 2,4,8,9 ,12 | 40 | 60 | 100 |
| 2. | 25CRT41 | Digital Forensics | ES(PC) | 3 | 0 | 0 | 3 | 3 | 4,8,9, 16 | 40 | 60 | 100 |
| 3. | 25CST43 | Standards in Computer Science | ES(PC) | 1 | 0 | 0 | 1 | 1 | 8,9,12 16,17 | 100 | - | 100 |
| 4. | 25CST44 | Object Oriented Software Engineering | ES(PC) | 3 | 0 | 0 | 3 | 3 | 4, 8, 9, 12,17 | 40 | 60 | 100 |
| 5. | 25CSI42 | Database Management Systems | ES(PC) | 3 | 0 | 2 | 5 | 4 | 4,8,9, 16,17 | 50 | 50 | 100 |
| 6. | 25ADT42 | Artificial Intelligence Essentials | ES(PC) | 3 | 0 | 0 | 3 | 3 | 4,8,9, 16,17 | 50 | 50 | 100 |
| 7. | 25SDC41 | Soft and Analytical Skills-I | SD | 1 | 0 | 0 | 1 | 1 | 4,8,10 | 100 | - | 100 |
| **Practicals** | | | | | | | | | | | | |
| 8. | 25ADL42 | Artificial Intelligence Laboratory | ES(PC) | 0 | 0 | 4 | 4 | 2 | 4,9,11 | 60 | 40 | 100 |
| **Mandatory Course** | | | | | | | | | | | | |
| 9. | | Mandatory Courses – III & | MC | 3 | 0 | 0 | 3 | 0 | | 100 | - | 100 |
| | | | **Total** | **20** | **0** | **6** | **26** | **20** | | | | |

**& Mandatory Course-III is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-III)**

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### SEMESTER V

| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | SDG Mapping | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | CA | ES | TM |
| **Theory** | | | | | | | | | | | | |
| 1. | 25CST51 | Principles of Compiler Design | ES(PC) | 3 | 0 | 0 | 3 | 3 | | 40 | 60 | 100 |
| 2. | 25CRT51 | Cyber law and Ethics | ES(PC) | 3 | 0 | 0 | 3 | 3 | | 40 | 60 | 100 |
| 3. | 25CRT52 | Mobile Computing | ES(PC) | 3 | 0 | 0 | 3 | 3 | | 40 | 60 | 100 |
| 4. | 25CRI51 | Cryptography and Cyber Security | ES(PC) | 3 | 0 | 2 | 5 | 4 | | 50 | 50 | 100 |
| 5. | 25CSI51 | Computer Networks | ES(PC) | 3 | 0 | 2 | 5 | 4 | | 50 | 50 | 100 |
| 6. | | Programme Elective I* | ES(PE) | 2 | 0 | 2 | 4 | 3 | | 50 | 50 | 100 |
| 7. | 25CRI52 | Industry Oriented Course - I | SD | 1 | 0 | 2 | 3 | 2 | | 50 | 50 | 100 |
| 8. | 25SDC51 | Soft and Analytical Skills-II | SD | 1 | 0 | 0 | 1 | 1 | 4,8 | 100 | - | 100 |
| | | | **Total** | **19** | **0** | **8** | **27** | **23** | | | | |

*** Programme Elective – I shall be chosen from the list of Programme electives (Streams) offered by same Programme**

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## Curriculum and Syllabus
## B.E.-Computer Science and Engineering(Cyber Security)

### SEMESTER VI

| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | SDG Mapping | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | CA | ES | TM |
| **Theory** | | | | | | | | | | | | |
| 1. | 25CYT61 | Climate Change and Sustainability | HUM | 2 | 0 | 0 | 2 | 2 | | 40 | 60 | 100 |
| 2. | 25CRT61 | Cyber Threat Intelligence | ES(PC) | 3 | 0 | 0 | 3 | 3 | | 40 | 60 | 100 |
| 3. | 25CRI61 | Quantum Cryptography | ES(PC) | 3 | 0 | 2 | 5 | 4 | | 50 | 50 | 100 |
| 4. | | Programme Elective II* | ES(PE) | 2 | 0 | 2 | 4 | 3 | | 50 | 50 | 100 |
| 5. | | Programme Elective III* | ES(PE) | 2 | 0 | 2 | 4 | 3 | | 50 | 50 | 100 |
| 6. | 25CRI62 | Industry Oriented Course - II | SD | 1 | 0 | 2 | 3 | 2 | | 50 | 50 | 100 |
| 7. | | Self Learning Course | SL | 1 | 0 | 0 | 1 | 1 | | - | - | 100 |
| **Practicals** | | | | | | | | | | | | |
| 8. | 25CRL61 | Cyber Security Laboratory | ES(PC) | 0 | 0 | 4 | 4 | 2 | | 60 | 40 | 100 |
| | | | **Total** | **14** | **0** | **12** | **26** | **20** | | | | |

*** Programme Elective – II to III shall be chosen from the list of Programme electives (Streams) offered by same Programme**

**@ The students individually undergo training in reputed Firms/Research Institutes/ Laboratories for the specified duration (02 weeks) during VI semester summer vacation. After completion of training, a detailed report should be submitted within ten days from the commencement of VII semester.**

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### SEMESTER VII

| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | SDG Mapping | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | CA | ES | TM |
| **Theory** | | | | | | | | | | | | |
| 1. | 25UHV71 | Universal Human Values-II | HUM | 3 | 0 | 0 | 3 | 3 | | 40 | 60 | 100 |
| 2. | 25EST71 | Engineering Entrepreneurship Development | HUM | 3 | 0 | 0 | 3 | 3 | | 40 | 60 | 100 |
| 3. | 25CRI71 | Ethical hacking and Penetration Testing | ES(PC) | 3 | 0 | 2 | 5 | 4 | | 50 | 50 | 100 |
| 4. | | Programme Elective IV* | ES(PE) | 2 | 0 | 2 | 4 | 3 | | 50 | 50 | 100 |
| 5. | | Programme Elective V* | ES(PE) | 2 | 0 | 2 | 4 | 3 | | 50 | 50 | 100 |
| 6. | | Open Elective ** | OE | 3 | 0 | 0 | 3 | 3 | | 40 | 60 | 100 |
| **Practicals** | | | | | | | | | | | | |
| 7. | 25CRL71 | Summer internship@ | SD | 0 | 0 | 2 | 2 | 1 | | 100 | - | 100 |
| 8. | 25CRL72 | Mini Project | SD | 0 | 0 | 4 | 4 | 2 | | 100 | - | 100 |
| | | | **Total** | **16** | **0** | **12** | **28** | **22** | | | | |

*** Programme Elective – IV to V shall be chosen from the list of Programme electives (Streams) offered by same Programme**

**** Open Elective shall be chosen from the list of open electives offered by other Programmes**

**@ - The students undergone summer internship during VI semester summer vacation and same will be evaluated in VII semester.**

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**SEMESTER VIII**

| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | SDG Mapping | Max.Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | | CA | ES | TM |
| **Practicals** | | | | | | | | | | | | |
| 1. | 25CRL81 | Project Work | SD | 0 | 0 | 20 | 20 | 10 | 4,8,9, 10,17 | 60 | 40 | 100 |
| | | | **Total** | **0** | **0** | **20** | **20** | **10** | | | | |

**TOTAL CREDITS: 165**

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| MANDATORY COURSES II | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | Max.Marks | | |
| | | | | L | T | P | | | CA | ES | TM |
| 1. | 25MDC31 | Introduction to Women and Gender Studies | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |
| 2. | 25MDC32 | Elements of Literature | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |
| 3. | 25MDC33 | Film Appreciation | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |
| 4. | 25MDC34 | Disaster Risk Reduction and Management | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |

| MANDATORY COURSES III | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S.No | Course Code | Course Title | Category | Periods / Week | | | Total Contact Period | Credits | Max.Marks | | |
| | | | | L | T | P | | | CA | ES | TM |
| 1. | 25MDC41 | Well Being with Traditional Practices -Yoga, Ayurveda and Siddha | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |
| 2. | 25MDC42 | History of Science and Technology in India | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |
| 3. | 25MDC43 | Political and EconomicThought for a Humane Society | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |
| 4. | 25MDC44 | State, Nation Building and Politics in India | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |
| 5. | 25MDC45 | Industrial Safety | MC | 3 | 0 | 0 | 3 | 0 | 100 | - | 100 |

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## PROGRAMME ELECTIVE COURSES: STREAMS

| Product Development | Application Security | Security and Privacy | Artificial Intelligence and Security | Computing | Internet of Things and Smart Applications |
|---|---|---|---|---|---|
| App Development | Social Network Analysis and Security | Privacy in Communication Networks | Natural Language Processing | Granular Computing | Dynamic Paradigm for IoT |
| Design Thinking and Innovation | Digital Forensics & Malware Analysis | Security in MANETs and VANETs | AI in Cyber Security | Augmented Reality/Virtual Reality | Smart IoT Architecture |
| UI and UX Design and Human Centered Design | Mobile Forensics | Cyber threat for IOT and Cloud | Generative AI and Prompt Engineering | Edge and Fog Computing | Wearable Computing |
| Business Analytics | Firewall Design | Cryptocurrency and Blockchain Technologies | Ethical and Legal Implications of AI | Cloud Service Management | IoT in 5G Networks |
| DevOps | Intrusion Detection and Prevention Systems | Ethical Hacking | Reactive machines and Self-aware AI | Cloud Computing | IoT and Smart Cities |
| Vibe Coding | Web and IOT Security | Modern Cryptography | Explainable AI | Neuromorphic and Energy –efficient computing | Game Development |
| Mobile Application Development | Network Security | Security and Privacy Cloud | Edge AI | Computational Neuro Science | IOT Security |

**Registration of Programme Elective Courses from Streams:**

Programme Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called streams that represent a particular areaof specialization / diversified group. Students are permitted to choose all the Programme Electives from a particular stream or from different streams. Further, only one Programme Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI.

The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E/B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2025 (Clause 18 & 19).

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## OPEN ELECTIVES

| Sl. No | Course Code | Course Title | Category | Periods /Week | | | Total Contact Periods | Credits | Max. Marks | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | L | T | P | | | CA | ES | TM |
| **OFFERED BY DEPARTMENT OF CIVIL ENGINEERING** | | | | | | | | | | | |
| 1 | 25CEO11 | Civil and Infrastructure Engineering | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25CEO12 | Environmental Pollution and waste management | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25CEO13 | Environmental Impact Assessment | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25CEO14 | Building Services | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25CEO15 | Water, Sanitation and Health | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING** | | | | | | | | | | | |
| 1 | 25CSO11 | Foundation of AR/VR | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25CSO12 | Web Designing | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25CSO13 | Block Chain fundamentals | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25CSO14 | Knowledge Management | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25CSO15 | Cloud Computing Essentials | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING** | | | | | | | | | | | |
| 1 | 25ECO11 | Basics of Electronics in Automation | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25ECO12 | Wireless Optical Communication | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25ECO13 | Soft Computing techniques | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25ECO14 | Consumer electronics | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25ECO15 | Principles of communication Engineering | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING** | | | | | | | | | | | |
| 1 | 25EEO11 | Renewable Energy Sources | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25EEO12 | Electrical Vehicle | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25EEO13 | Energy Auditing and Conservation | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25EEO14 | Domestic and Industrial Electrical Installations | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25EEO15 | Microcontroller Based System Design | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF MECHANICAL ENGINEERING** | | | | | | | | | | | |
| 1. | 25MEO11 | Industrial Instrumentation | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 2. | 25MEO12 | Energy Technology | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3. | 25MEO13 | Reverse Engineering | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4. | 25MEO14 | Fire Safety Engineering | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5. | 25MEO15 | Nano Technology | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 6. | 25MEO16 | Entrepreneurship Development | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE** | | | | | | | | | | | |
| 1 | 25ADO11 | Introduction to Big Data | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25ADO12 | Principles of Data Science | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25ADO13 | Data Visualization and its Applications | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25ADO14 | Data Warehousing and Mining | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25ADO15 | Principles of Cyber Security | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF INFORMATION TECHNOLOGY** | | | | | | | | | | | |
| 1 | 25ITO11 | Basics of Java Programming | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25ITO12 | Ethical Hacking | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25ITO13 | E-Commerce and Applications | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25ITO14 | Basics of Android Application Development | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25ITO15 | Introduction to Web Design | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY** | | | | | | | | | | | |
| 1 | 25PTO11 | Nutraceuticals | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25PTO12 | IPR for Pharma Industry | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25PTO13 | Pharmaceutical Nanotechnology | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25PTO14 | Basics of Human Anatomy and physiology | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF BIOMEDICAL ENGINEERING** | | | | | | | | | | | |
| 1 | 25BMO11 | Biosensors and Instrumentation | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25BMO12 | Medical Robotics | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25BMO13 | Biometric systems and their applications | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25BMO14 | Healthcare Management systems | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25BMO15 | IoT in Healthcare | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **OFFERED BY DEPARTMENT OF BIOTECHNOLOGY** | | | | | | | | | | | |
| 1. | 25BTO11 | Biofertilizer Technology | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2. | 25BTO12 | Ecology | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3. | 25BTO13 | Biotechnology for Forensics | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4. | 25BTO14 | Microbiology and Macromolecule | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5. | 25BTO15 | Biodiversity and Taxonomy | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF CSE (CYBER SECURITY)** | | | | | | | | | | | |
| 1 | 25CRO11 | Mobile Device Security | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25CRO12 | Malware Analysis | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25CRO13 | Hardware Security | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25CRO14 | Web and Mobile Application Security | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25CRO15 | Information Security | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| **OFFERED BY DEPARTMENT OF CSE(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)** | | | | | | | | | | | |
| 1 | 25AMO11 | AI For Everyone | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 2 | 25AMO12 | Machine Learning and its Applications | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 3 | 25AMO13 | Quantum AI | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 4 | 25AMO14 | Reinforcement Learning ★ | OE | 3★ | 0 | 0 | 3 | 3 | 40 | 60 | 100 |
| 5 | 25AMO15 | Network Automation Using AIML | OE | 3 | 0 | 0 | 3 | 3 | 40 | 60 | 100 |

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| | | L | T | P | C |
|---|---|---|---|---|---|
| 25IPA11 | INDUCTION PROGRAMME | - | - | - | 0 |
| SDG No. 3,4,10,11,16 | (Common to B.E./B.Tech. all Branches) | | | | |

This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over.

The induction programme has been introduced by AICTE with the following objective:

"Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed."

"One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character. "
Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

**(i) Ice breaking:**

Ice-breaking activities were conducted within the respective departments/branches to facilitate interaction among students. These sessions helped participants become acquainted with one another, fostered a sense of belonging, and encouraged teamwork and effective communication. The activities created a friendly and engaging learning environment.

**(ii) Creative Arts and Physical Activities:**

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program. These would allow for creative expression and it would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later. Physical Activities would involve a daily routine of physical activity with games and sports, gardening, etc.



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**(iii) Universal Human Values:**

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and dont's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

**(iv) Literary Activity:**

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

**(v) Proficiency Modules:**

This would address some lacunas that students might have, for example, English, computer familiarity etc.

**(vi) Lectures by Eminent People:**

Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

**(vii) Visits to Local Area:**

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

**(viii) Familiarization to Dept./Branch & Innovations:**

They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

**(ix) Department Specific Activities:**

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop.

For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple



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circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

(x) Life at SVHEC and its activities:

A campus tour was organized to familiarize students with the college infrastructure and facilities. During the tour, students visited various academic blocks, laboratories, library, seminar halls, sports facilities, administrative offices, and other important locations within the campus. The session helped students gain a better understanding of the resources available to support their academic and personal development while fostering a sense of comfort and belonging in the new environment.

A session on college activities was conducted to introduce students to the various academic, co-curricular, and extracurricular opportunities available on campus. Students were informed about clubs, professional societies, cultural events, sports activities, community service initiatives, and skill development programmes. The session encouraged active participation and highlighted the importance of holistic development alongside academic excellence.

**Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.**

REFERENCES:

1. Guide to Induction program from AICTE

COURSEOUTCOMES:

At the end of the course the students will be able

CO1: To listen to and understand general and complex academic information
CO2: To listen to and understand different points of view in a discussion
CO3: To speak fluently and accurately informal and informal communicative contexts
CO4: To describe products and processes and explain their uses clearly as well as accurately
CO5: To express their opinions effectively in both formal and informal discussions

E.RESOURCES:

- https://www.ted.com/about/programs-initiatives/ted-talks-education
- https://learnenglish.britishcouncil.org/



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CO's - PO's & PSO's MAPPING:

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | - | - | - | - | 3 | 3 | - | 3 | 1 | - | - |
| CO2 | - | - | - | - | - | - | - | 3 | 3 | - | 3 | 1 | - | - |
| CO3 | - | - | - | - | - | - | 1 | 2 | 3 | - | 2 | 1 | 1 | - |
| CO4 | - | - | - | - | - | - | - | 2 | 3 | - | 2 | 1 | 1 | - |
| CO5 | - | - | - | - | - | - | 1 | 3 | 3 | - | 2 | 1 | 1 | 1 |
| AVG | - | - | - | - | - | - | 1.0 | 2.6 | 3.0 | - | 2.4 | 1.0 | 1.0 | 1.0 |

1 - Low, 2 - Medium , 3 - High, '-' - no correlation



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| | | L | T | P | C |
|---|---|---|---|---|---|
| 25ENI11 | COMMUNICATIVE ENGLISH–I | 3 | 0 | 2 | 4 |
| SDG No. 4,5,8,9,16 | (Common to B.E./B.Tech. All Branches) | | | | |

COURSE OBJECTIVES:

- To build a strong foundation in basic grammar and communication skills through structured activities in listening, speaking, reading and writing.
- To develop the ability to express, describe and summarize ideas clearly using appropriate language structures and professional formats.
- To enhance technical communication by practicing structured descriptions, storytelling and data-based writing tasks.
- To enable clear and logical expression through organized speech, note-making and grammar-focused writing.
- To refine expressive and comparative communication skills using advanced vocabulary, professional formats and contextual grammar.

UNIT-I BUILDING BLOCKS OF COMMUNICATION 6+6

Grammar : Parts of Speech -Verbs - Word formation - Articles

Listening : Listening to Short Conversations & Descriptions

Speaking : Introducing oneself - Narrating Personal Experience

Reading : Reading Comprehension -Skimming - Scanning - Speed reading

Writing : Formal Letter Writing (Seeking Permission for Industrial Visit & In plant Training) - Instruction Writing

UNIT-II PROFESSIONAL AND SOCIAL COMMUNICATION 6+6

Grammar : Conjunction- Preposition- Cause And Effect Expression- Purpose and Means

Listening : Listening for Specific Information (Gap Filling); Listening the Announcement for Data

Speaking : Introducing the Peers- Describing about Person, Place, Things, Food, Culture, etc.

Reading : Reading Newspaper Articles & Technical Blogs

Writing : Professional Email Writing – Checklist



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| UNIT-III | COMPREHENSION AND PRESENTATION SKILLS | 6+6 |
|---|---|---|

Grammar : Types of Sentence - Negatives -Types of Question (Y/N & WH ) - Degrees of Comparison.
Listening : Listening to TED Talks and Short Technical Reels
Speaking : Story Telling & Role Play
Reading : Reading comprehension- Reading Print Interview and Answering to the Questions
Writing : Paragraph Writing- Data Interpretation & Transcoding (Bar, Pie & Flow Chart)

| UNIT-IV | ENGLISH FOR WORKPLACE READINESS | 6+6 |
|---|---|---|

Grammar : Tense (Simple, Continuous, Perfect & Perfect Continuous)
Listening : Listening to Inspirational Speech & Professional Interviews
Speaking : Extempore Speech- Asking for Information (Direction & General Enquiries)
Reading : Reading Engineering/ Technical Essays - Reading Brochures
Writing : Note Making & Note Taking - Recommendation Writing

| UNIT-V | ENGLISH FOR FORMAL AND FUNCTIONAL COMMUNICATION | 6+6 |
|---|---|---|

Grammar : Modal Auxiliaries - Homophones & Homonyms - Numerical Adjectives - Phrasal Verbs
Listening : Listening to Telephonic Conversation- Listening to Product Description
Speaking : Master of Ceremony(MoC): Welcome Address & Vote of Thanks
Reading : Reading Graphical Materials for Comparison - Reading Advertisement
Writing : Report Writing (Accident/ Survey) - Compare and Contrast Essay Writing

TOTAL : 60 PERIODS

COURSE OUTCOMES:
At the end of the course,

CO1: Learners will be able to apply basic grammar rules and effectively use LSRW skills for formal and informal communication.

CO2: Learners will be able to construct coherent descriptions and summaries using appropriate connectors, prepositions, and professional vocabulary.

CO3: Learners will be able to describe processes and products clearly in spoken and written formats using suitable sentence structures and data interpretation skills.



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CO4: Learners will be able to classify information, make recommendations, and present structured content through both oral and written communication.

CO5: Learners will be able to express opinions, compare information, and write detailed reports using advanced grammar, graphical references, and formal structures.

TEXT BOOKS:

1. Department of English, AnnaUniversity, "English for Engineers & Technologists"Orient Blackswan Private Ltd,2020.
2. Dr.Veena Selvam, Dr.Sujatha Priyadarshini, & CO, Department of English, Anna University, "English for Science & Technology" Cambridge University Press, 2021.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma,"Technical Communication – Principles and Practices", Oxford Univ. Press, New Delhi, 2016.
2. Lakshminarayanan, "A Course Book on Technical English", Scitech Publications (India) Pvt.Ltd. 2012.
3. Aysha Viswamohan, "English For Technical Communication (With CD)", Mcgraw Hill Education, ISBN : 0070264244, 2008.
4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House, 2016.

E. RESOURCES:

- https://learnenglish.britishcouncil.org/

COs-Pos MAPPING:

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | - | - | - | - | 2 | 3 | - | 3 | - | - | - |
| CO2 | - | - | - | - | - | - | - | 2 | 3 | - | 2 | - | 1 | - |
| CO3 | - | - | - | 1 | - | - | - | 3 | 3 | - | 3 | - | 1 | - |
| CO4 | - | - | - | 1 | - | - | - | 3 | 3 | - | 3 | - | - | - |
| CO5 | - | - | - | - | - | - | - | 2 | 3 | - | 2 | - | 1 | - |
| AVR | - | - | - | 1.00 | - | - | - | 2.40 | 3.00 | - | 2.60 | | 1.00 | |

1- Low, 2- Medium, 3-High, "-" No Correlation

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| 25MAT11 | MATRICES AND CALCULUS | L | T | P | C |
|---|---|---|---|---|---|
| SDG NO.4,8,9,11 | (Common to B.E./B.Tech. all Branches) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES :

- To understand the concepts of eigen values, eigen vectors and quadratic forms.
- To develop the skill on the geometric properties of curves using differential calculus.
- To equip students to analyze and optimize the functions of several variables.
- To make the students understand various techniques of integration.
- To apply vector calculus and its principles to evaluate vector fields.

UNIT-I MATRICES 9

Eigen values and Eigen vectors of a real matrix – Characteristic equation–Properties of Eigen values and Eigen vectors – Cayley - Hamilton theorem – Reduction of a quadratic form to canonical form by orthogonal transformation–Nature of quadratic forms.

UNIT-II DIFFERENTIAL CALCULUS 9

Curvature – Radius of curvature (Cartesian Co – ordinates only) – Centre of curvature and Circle of curvature – Involutes and Evolutes (Parabola, Ellipse).

UNIT-III FUNCTIONS OF SEVERAL VARIABLES 9

Euler's theorem for homogenous functions - Jacobians – Taylor's series expansion – Maxima and Minima for functions of two variables – Methods of Lagrangian multipliers.

UNIT-IV INTEGRAL CALCULUS 9

Definite and Indefinite integrals - Substitution rule - Techniques of Integration : Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Improper integrals.

UNIT-V VECTOR CALCULUS 9

Irrotational and solenoidal vector fields – Green's theorem in plane , Gauss divergence theorem and Stoke's theorem (Cube, Cuboid and Rectangular paralleopiped only ).

TOTAL: 45 PERIODS



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COURSE OUTCOMES :

At the end of the course the students will be able to :

CO1: Assimilate the eigen values and eigen vectors in reduction of quadratic form into canonical form.

CO2: Analyze the center of curvature, circle of curvature and develop the evolutes.

CO3: Expand the Taylor series and calculate the extreme value for function of several variables.

CO4: Apply different methods of integration in solving practical problems.

CO5: Apply the divergence and curl in vector integral theorems of vector fields.

TEXTBOOKS :

1. James Stewart, "Calculus : Early Transcendental", Cengage Learning, 9th Edition, New Delhi, 2023. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5,7.1 - 7.4 and 7.8 ].
2. Grewal. B. S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th Edition, 2020.

REFERENCE BOOKS :

1. Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India, 2022.
2. Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2021.
3. Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2019.
4. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2019.

E-Resources :

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc22_ma03
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc23_ma86



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CO's – PO's & PSO'S MAPPING :

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 1 | - | - | - | 2 | - | 2 | 3 | 1 | 3 | 1 |
| CO2 | 3 | 3 | 2 | 2 | - | - | - | 3 | - | 2 | 3 | 1 | 3 | 1 |
| CO3 | 3 | 3 | 2 | 2 | - | - | - | 3 | - | 2 | 3 | 2 | 3 | 2 |
| CO4 | 3 | 3 | 2 | 1 | - | - | - | 2 | - | 2 | 3 | 2 | 3 | 2 |
| CO5 | 3 | 2 | 2 | 1 | - | - | - | 2 | - | 2 | 3 | 3 | 3 | 3 |
| AVG | 3.00 | 2.80 | 2.00 | 1.40 | - | - | - | 2.40 | - | 2.00 | 3.00 | 1.80 | 3.00 | 1.80 |

1- Low, 2- Medium , 3-High, "-" No Correlation



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| 25PHI11 | ENGINEERING PHYSICS | L | T | P | C |
|---|---|---|---|---|---|
| SDG No. 3, 4, 9, 11, 12 | (B.E./B. Tech. - Common to all branches) | 3 | 0 | 2 | 4 |

COURSE OBJECTIVES:

- To make the students effectively achieve an understanding of mechanics.
- Provide knowledge of elastic property, thermal property of materials and its applications.
- Impart knowledge of laser and their applications.
- Introduce the essential principles of fiber optics and its applications.
- Equipping the students to successfully understand the importance of quantum physics.

**UNIT-I MECHANICS 10**

Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies – Motion of the CM – Moment of inertia – Theorems of M.I. – M.I of a diatomic molecule – Torque – Rotational energy state of a rigid diatomic molecule – Torsional pendulum – double pendulum.

**UNIT-II PROPERTIES OF MATTER 10**

Elasticity- Hooke's law – stress – strain diagram – Poisson's ratio – Factors affecting elasticity – bending of beams - Bending moment equation – Depression of a cantilever – Young's modulus by uniform bending – I-shaped girders.

**UNIT-III LASER 9**

Lasers: Stimulated absorption – Spontaneous emission – Stimulated emission – Population inversion-Einstein's coefficients derivation and their relations – Pumping methods – Types of lasers – $CO_2$ laser, Semiconductor lasers (Homojunction & Heterojunction) – Holography - Industrial and Medical Applications of lasers.

**UNIT-IV FIBER OPTICS 8**

Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle – Types of optical fibres (Material, Refractive Index, Mode) – Attenuation, Dispersion, Bending – Fiber optics communication system (qualitative) – Temperature and Displacement sensors – Fiber optic endoscope.

**UNIT-V QUANTUM PHYSICS 8**

Photons and light waves – Electrons and matter waves – The Schrodinger equation (Time dependent and time independent forms) – Particle in a one-dimensional rigid box for Eigen value and Eigen function – tunneling (qualitative) – Electron microscope - Scanning Tunneling microscope.

**TOTAL: 45 PERIODS**



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PRACTICAL EXERCISE:

1. Determination of rigidity modulus of wire and moment of inertia of regular objects – Torsion pendulum.
2. Determination of Young's modulus by Uniform bending method.
3. Determination of Simple harmonic oscillations of cantilever.
4. Determination of the wavelength of the laser using grating
5. Determination of width of the groove of CD using laser.
6. Determination of numerical aperture and acceptance angle in an optical fiber.
7. Determination particle size of Lycopodium powder using semiconductor laser.
8. Determination of thickness of a material by Air-wedge method.

COURSE OUTCOMES:

At the end of the course the students will be able to

| | |
|---|---|
| CO1: | Demonstrate the foundational knowledge in Mechanics. |
| CO2: | Interpret the elastic properties of solid materials and their applications. |
| CO3: | Apply the comprehended knowledge about laser and its applications. |
| CO4: | Apply the comprehended knowledge about fibre optic communication system in various engineering applications. |
| CO5: | Understand the fundamental principles of quantum mechanics. |

TEXT BOOKS:

1. D.Kleppner and R.Kolenkow, "An Introduction to Mechanics," McGraw Hill Education (IndianEdition), 2021.
2. Arthur Beiser, Shobhit Mahajan, S.Rai Choudhury, "Concepts of Modern Physics," McGraw-Hill (Indian Edition), 2024.

REFERENCE BOOKS:

1. K.Thyagarajan and A.Ghatak, "Lasers: Fundamentals and Applications," Laxmi Publications, (Indian Edition), 2023



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2. D.Halliday, R.Resnick and J.Walker, "Principles of Physics," Wiley (Indian Edition), 2021
3. N.Garcia, A.Damask and S.Schwarz, "Physics for Computer Science Students," Springer-Verlag, 2012

PRACTICAL REFERENCES:

1. A.K. Katiyar (Author), C.K. Pandey, Engineering Physics: Theory and Practical Paperback, 2015.

E- RESOURCES:

1. https://archive.nptel.ac.in/courses/113/106/113106039/
2. https://vlab.amrita.edu/?sub=1
3. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph52
4. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph36

CO's- PO's MAPPING

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | 3 | 3 | 3 |
| CO2 | 3 | 3 | 2 | 1 | 1 | - | - | - | - | - | - | 2 | 3 | 2 |
| CO3 | 3 | 2 | 2 | 1 | 2 | - | - | - | - | - | - | 3 | 2 | 3 |
| CO4 | 3 | 2 | 2 | 1 | 2 | - | - | - | - | - | - | 3 | 2 | 3 |
| CO5 | 3 | 3 | 1 | 1 | 2 | - | - | - | - | - | - | 3 | 3 | 2 |
| AVG | 3.00 | 2.60 | 1.80 | 1.00 | 1.60 | | | | | | | 2.80 | 2.60 | 2.60 |

1 - Low, 2 - Medium , 3 - High, '-' - no correlation



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| 25CYI11 | ENGINEERING CHEMISTRY | L | T | P | C |
|---|---|---|---|---|---|
| SDG No. 4,6,7 | (Common to B.E. / B.Tech. all Branches) | 3 | 0 | 2 | 4 |

COURSE OBJECTIVES:

- To provide foundational knowledge on water quality and water treatment processes.
- To introduce the principles of nanochemistry, methods of synthesizing nanomaterials, and their applications.
- To familiarize students with polymer chemistry, polymerization techniques, and the manufacturing methods of plastics.
- To impart knowledge on fuels and combustion, including manufacturing of fuels, fuel analysis, and alternative energy sources.
- To develop an understanding of electrochemistry and its applications in energy storage devices and electric vehicles.

**UNIT-I** **WATER AND ITS TREATMENT** 9

Water quality parameters – Estimation of hardness by EDTA method - Boiler troubles - Internal treatment and External treatment of boiler feed water – Ion exchange method and zeolite process – Desalination method: Reverse Osmosis.

**UNIT-II** **NANOCHEMISTRY** 9

Basics of Nanochemistry - Size-dependent properties - Types of nanomaterials: nanoparticle, nanowire, nanorod and nanotube - Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, electrochemical deposition - Applications of nanomaterials.

**UNIT-III** **POLYMER CHEMISTRY** 9

Basics of polymer chemistry - Mechanism of polymerization: Addition (Free Radical); condensation and copolymerization - Thermoplastics & thermosetting plastics - Preparation, properties and uses of Nylon 6, 6 and Epoxy resin - Fabrication of plastics - (Compression, Injection & Extrusion moulding).

**UNIT-IV** **FUELS AND COMBUSTION** 9

Classi ication of fuels - Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method) - Manufacture of synthetic petrol (Bergius process) - Knocking - octane number, cetane number - Power alcohol and biodiesel - Flue gas analysis - ORSAT Method.

**UNIT-V** **ELECTROCHEMISTRY AND STORAGE DEVICES** 9

Types of cells – types of electrodes: calomel electrode, glass electrode – Nernst equation – EMF series - Batteries: Primary battery - Dry cell, Secondary battery - lead acid battery and lithium-ion-battery; $H_2$-$O_2$ fuel cell; Supercapacitors - Electric vehicles.

TOTAL: 45 HOURS

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PRACTICAL EXERCISES:

1. Determination of types and amount of alkalinity in a water sample.
2. Determination of total, temporary & permanent hardness of water sample by EDTA method.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of amount of given hydrochloric acid using pH meter.
5. Determination of amount of acids in a mixture of acids ($HCl+CH_3COOH$) using conductivity meter.
6. Conductometric titration of barium chloride against sodium sulphate (precipitation titration).
7. Estimation of iron content of the given solution using potentiometer.
8. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.

TOTAL: 30 HOURS

GRAND TOTAL: 45 + 30 = 75 HOURS

COURSE OUTCOMES:

At the end of the course the students will be able to

CO1: Assess the quality of water from water quality parameter and propose suitable treatment methodologies to treat water.

CO2: Summarize the basic concepts of nanochemistry in designing the synthesis of nanomaterials for engineering and technology applications.

CO3: Understand the basic knowledge of polymers to apply the futuristic material needs.

CO4: Familiar with the concepts of fuels for engineering processes and applications.

CO5: Apply the concept of electrochemistry in the fabrication of energy storage devices.

TEXT BOOKS:

1. Dr. A. Ravikrishnan, "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Limited, 23rd Edition, 2023.
2. S. S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCE BOOKS:

1. Shashi Chawla, "A Text Book of Engineering Chemistry", Dhanpat Rai & Co (Pvt.) Ltd, New Delhi, 2011.
2. O.G. Palanna, "Engineering Chemistry", McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.



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E-RESOURCES:

Unit1:
https://www.youtube.com/watch?v=4SRMmqH2s4&list=PLLy_2iUCG87AZvtaiuD3r4HATrBKhb90P (IIT ROORKEE NPTEL) & https://www.youtube.com/watch?v=o6iurO2Cwd0 (NPTEL-NOC IITM)

Unit 2:
https://www.youtube.com/watch?v=0EWCqClsFOA&list=PLyqSpQzTE6M8682dGkNTN8936vSY4CbqZ (NPTEL-NOC IITM)

Unit 3:
https://www.youtube.com/watch?v=jSNImOwpxYg&list=PLbMVogVj5nJT0slH3tuas5BIp1DG8ZpMj (NPTELHRD)

Unit 4:
https://www.youtube.com/watch?v=1-EliKQ0erA (AKTU DIGITAL EDUCATION)

Unit 5:
https://www.youtube.com/watch?v=nh2xbyOaERw &
https://www.youtube.com/watch?v=iFVVv23ZzGE (IIT ROORKEE NPTEL)

CO's- PO's MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 1 | 1 | 3 | - | - | - | - | - | - | - | - |
| CO2 | 3 | 2 | 1 | 1 | 2 | 2 | - | - | - | - | 1 | - | - | 1 |
| CO3 | 3 | 3 | 1 | 1 | 1 | 1 | - | - | - | - | - | 1 | - | 1 |
| CO4 | 3 | 2 | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | - |
| CO5 | 3 | 2 | 2 | 1 | 2 | 2 | - | - | - | - | - | - | - | 1 |
| AVR | 3.0 | 2.4 | 1.6 | 1.0 | 1.4 | 1.8 | - | - | - | - | 1.0 | 1.0 | - | 1.0 |

1- Low, 2- Medium , 3-High, "-" No Correlation



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| | | L | T | P | C |
|---|---|---|---|---|---|
| 25CSI11<br>SDG No: 4, 8, 9, 10,17 | **PROBLEM SOLVING USING C PROGRAMMING**<br>(Common to: B.E. / B.Tech. all Branches) | 3 | 0 | 2 | 4 |

**COURSE OBJECTIVES:**

- To learn how to think algorithmically to solve a problem.
- To gain knowledge of fundamental programming concepts in C programming.
- To explore the basic concept of arrays and pointers.
- To learn concept of functions and structures.
- To gain proficiency in file handling techniques.

**UNIT-I** **COMPUTATIONAL THINKING** 9

Overview of Computational Thinking and Key Techniques – Overview of Software Development Life Cycle – Introduction to Algorithmic Thinking – Elements: Sequence, Selection and Repetition – Representation of Flow Chart – Overview of Flow algorithm Tool – Pseudo- code– Introduction to programming languages

**UNIT-II** **BASICS OF C PROGRAMMING** 9

Introduction to C - Structure of C Programming - Compiling - Executing and Debugging - Character Set – Tokens - Identifiers - Data Types – Variable – Constants - Evaluating Expression - Type Conversion - Input and Output - Decision control and looping statements

**UNIT-III** **ARRAYS AND POINTERS** 9

Introduction to Arrays - Declaration and Initialization of Single Dimensional Arrays - Array Operations - Declaration and Initialization of Two-Dimensional Arrays - Multidimensional Arrays - Declaring and Initializing Strings - Reading and Writing Strings - String Operations - Array of Strings. Introduction to Pointers - Pointer operators - Pointer arithmetic - Arrays and pointers - Array of pointers.

**UNIT-IV** **FUNCTIONS AND STRUCTURES** 9

Function - Types of Function – Elements - Pass by value - Pass by reference – Recursion - Storage Classes. Introduction to structures - Declaring and Defining Structure Variables - Accessing Structure Members - Structure Initialization - Nested structures - Array of structure – typedef - Union

**UNIT-V** **FILE PROCESSING** 9

Files: Introduction – Using files in C – Read data from files – Writing data to files – Error handling during File operation – Command line arguments.

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**TOTAL : 45 PERIODS**

PRACTICAL EXERCISES:

1. Implementation of algorithm, flowchart and pseudo code to solve electricity billing.
2. Implementation of algorithm, flowchart and pseudo code to solve retail shop billing.
3. Implementation of if, if-else, nested if and switch statements.
4. Implementation of while, do-while and for loops.
5. Implementation of sorting and searching algorithms.
6. Implementation of one-dimensional array, passing array to functions and array operations.
7. Implementation of programs for implementing various string operations like "copy", "finding length", "compare", "concatenate" with and without built-in library functions.
8. Implementation of pointer operators, call by reference, pointers with array.
9. Implementation of function calls, recursion, call by value.
10. Implementation of structure and nested structure.
11. Implementation of array of structures.
12. Implementation of file operations.
13. Implementation of file to read N character using file functions.

TOTAL: 30 PERIODS

TOTAL: 75 (45+30) PERIODS

COURSE OUTCOMES:

At the end of the course the students will be able to

CO 1 : Construct algorithmic solutions for a given computational problem.

CO 2 : Demonstrate the understanding of fundamental concepts of C programming.

CO 3 : Utilize appropriate concepts of arrays and pointers to solve the programming problems effectively.

CO 4 : Apply concepts of functions and structures in C programming

CO 5 : Implement file I/O operations to store and retrieve data from files.

TEXT BOOKS:

1. GVenkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
2. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2023.
3. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2023.

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REFERENCE BOOKS:

1. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2023
2. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C",

McGraw-Hill Education, 2024.

3.Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2022.

4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2024.

**E-RESOURCES:**

1. Tutorial point - https://www.tutorialspoint.com/c programming/index.htm
2. Greek for geeks - https://www.geeks for geeks.org/c-programming-language/

**CO's – PO's & PSO's MAPPING**

| CO'S | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2 | - | 3 | 3 | 1 | 2 | 2 |
| CO2 | 2 | 3 | 2 | 1 | 2 | 1 | 1 | 2 | - | 3 | 2 | 2 | 2 | 2 |
| CO3 | 3 | 2 | 2 | 1 | 3 | 1 | 1 | 2 | - | 3 | 3 | 2 | 2 | 2 |
| CO4 | 2 | 3 | 3 | 1 | 2 | 2 | 1 | 2 | - | 3 | 2 | 2 | 3 | 2 |
| CO5 | 2 | 2 | 3 | 2 | 1 | - | - | 2 | 1 | 2 | 2 | 2 | 2 | 2 |
| AVG | 2.2 | 2.4 | 2.4 | 1.2 | 2 | 1.3 | 1 | 2 | 1 | 2.8 | 2.4 | 1.8 | 2.2 | 2 |

1 - low, 2 - medium, 3 - high, '-' - no correlation

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| 25TAT11 | HERITAGE OF TAMILS | L | T | P | C |
|---|---|---|---|---|---|
| SDG No. 3, 4, 8,11, 16 | (B.E./B.Tech-Common to all branches) | 1 | 0 | 0 | 1 |

COURSE OBJECTIVES:

- To understand the Sangam and modern literature of Tamil.
- To learn the heritage of Tamil culture.
- To recognize the various art forms of Tamils.
- To explain the Thinai concept of Tamils.
- To realize the contribution of Tamils to Indian national movement and Indian culture.

**UNIT-I** **LANGUAGE AND LITERATURE** 3

Language Families in India.- Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature- Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land- Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modernliterature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

**UNIT-II** **HERITAGE – ROCK ART PAINTINGS TO MODERN ART - SCULPTURE** 3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

**UNIT-III** **FOLK AND MARTIAL ARTS** 3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam,Valari, Tiger dance - Sports and Games of Tamils.

**UNIT-IV** **THINAI CONCEPTS OF TAMILS** 3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.



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UNIT-V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE 3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the otherparts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL : 15 PERIODS

COURSE OUTCOMES:

At the end of the course the student will be able to

CO1: Gain knowledge about various literatures of Tamil.

CO2: Learn the uniqueness of Tamil cultural heritage.

CO3: Find various art forms of Tamil Nadu.

CO4: Understand the Thinai concepts in Tamil.

CO5: Distinguish the contribution of Tamils to Indian national movement and Indian culture.

TEXT BOOK:

1. Heritage of Tamils, Dr. P. Inthirani, Jai Balaji Publications, Chennai.

REFERENCES:

1. Thamizhaga Varalarum Makkal Panpaadum, Dr. K. K. Pillai, Ulaga Tamizharaichi Niruvanam, Chennai.

E- RESOURCES:

1. https://www.tamilvu.org/

CO's –PO's MAPPING:

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| CO2 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| CO3 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| CO4 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| CO5 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| AVG | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |

1 - Low, 2 - Medium , 3 - High, '-' - No Correlation



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| 25TAT11 | தமிழர் மரபு | L | T | P | C |
|---|---|---|---|---|---|
| SDG No. 3, 4, 8,11, 16 | (B.E./B.Tech- அனைத்து பாடப்பிரிவுகளுக்கும் பொதுவானது) | 1 | 0 | 0 | 1 |

பாடநெறி நோக்கங்கள்:

- தமிழின் இலக்கியங்கள் மற்றும் நவீன இலக்கியங்களைப் புரிந்துகொள்ளுதல்.
- தமிழ் கலாச்சார பாரம்பரியத்தைக் கற்றுக்கொள்ளுதல்.
- தமிழர்களின் பல்வேறு கலைவடிவங்களைக் கண்டறிதல்.
- தமிழர்களின் திணைக்கோட்பாடுகளை விளக்குதல்.
- இந்திய சுதந்திர போராட்ட இயக்கங்களுக்கும் இந்திய கலாச்சாரத்திற்குமான தமிழர்களின் பங்களிப்பை உணர்தல்.

அலகு - I மொழி மற்றும் இலக்கியம் 3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமய சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் ஆறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த மதங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு - II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை 3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப்பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு - III நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகள் 3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு - IV தமிழர்களின் திணைக் கோட்பாடுகள் 3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம்



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மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு : சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவு, கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு - V இந்திய தேசிய இயக்கம் மற்றும் 3

இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிற்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.

மொத்தம்: 15 பாடவேளைகள்

பாடநெறி முடிவுகள்:

இப்பாடத்தைப் படிப்பதின் முடிவில் மாணவர்கள்

CO1: தமிழின் பல்வேறு இலக்கியங்களைப் பற்றிய அறிவைப் பெறுவார்கள்.

CO2: தமிழ் கலாச்சார பாரம்பரியத்தின் தனித்தன்மையைக் கற்றுக்கொள்வார்கள்.

CO3: தமிழகத்தின் பல்வேறு கலைவடிவங்களைக் கண்டறிவார்கள்.

CO4: தமிழர்களின் திணைக்கோட்பாடுகளை அறிந்துகொள்வார்கள்.

CO5: தமிழ் சுதந்திரப்போராட்ட வீரர்கள் மற்றும் தமிழ் கலாச்சாரத்தை இந்தியாவின் மற்ற பகுதியுடன் ஒப்பிடும் திறனைப் பெறுவார்கள்.

பாடநூல்:

1. தமிழர் மரபு, முனைவர் ப. இந்திராணி, ஜெய் பாலாஜி பதிப்பகம், சென்னை.

பார்வை நூல்:

1. தமிழக வரலாறும் மக்கள் பண்பாடும், டாக்டர் கே. கே. பிள்ளை, உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை.

மின் - ஆதாரங்கள்:

1. https://www.tamilvu.org/



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CO's –PO's விவரணையாக்கம்:

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| CO2 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| CO3 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| CO4 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| CO5 | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |
| AVG | - | - | - | - | - | 1 | 1 | - | 1 | - | - | - | - | - |

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation



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| 25MEL11 | IDEA LAB | L | T | P | C |
|---|---|---|---|---|---|
| SDG No. 4, 8, 9, 11, 12 | (Common to B.E./B.Tech all branches) | 0 | 0 | 4 | 2 |

**Course Objectives:**

The main learning objective of this course is to prepare the students to:

- Develop hands-on skills in schematic design and PCB layout for custom electronic circuits.
- Enable students to fabricate, assemble, and test PCBs using standard manufacturing practices.
- Impart practical knowledge in embedded system programming using Arduino and Raspberry Pi platforms.
- Provide exposure to workshop tools including welding, lathes, and plumping equipment for physical prototyping.
- Facilitate the design and fabrication of complete working prototypes through integration of embedded hardware and 3D-printed or machined enclosures.

**LIST OF EXPERIMENTS:**

1. Schematic and PCB layout design of a suitable circuit.
2. Fabrication and testing of the Printed Circuit Board (PCB).
3. Embedded programming using Arduino and/or Raspberry Pi.
4. Familiarity and use of welding equipment.
5. Familiarity and use of lathe operations.
6. Familiarity and use of plumping equipment.
7. 3D Printing practice using Fusion Deposit Modeling (FDM).
8. Design and implementation of a capstone project involving embedded hardware, software and machined or 3D printed enclosure.

**TOTAL : 60 PERIODS**

**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

| | |
|---|---|
| **CO1:** | Design and simulate electronic circuits and translate them into PCB layouts using industry-standard tools. |
| **CO2:** | Fabricate and test printed circuit boards ensuring reliability and functionality of electronic components. |
| **CO3:** | Write and debug embedded programs using Arduino/Raspberry Pi for real-world applications |
| **CO4:** | Operate welding, lathe, and plumping tools to build enclosures and mechanical fixtures for prototypes. |
| **CO5:** | Integrate embedded systems with 3D-printed/machined parts to develop and present a functional capstone project. |

**REFERENCE BOOKS:**

1. AICTE's Prescribed Textbook: Workshop / Manufacturing Practices (with Lab Manual), ISBN: 978-9391505332
2. Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards. Simon Monk and Duncan Amos. McGraw Hill Education. ISBN-13 : 978-1260019193.

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3. 3D Printing & Design, Dr. Sabrie Soloman, ISBN: 978-9386173768, Khanna Book Publishing Company, New Delhi.
4. Programming Arduino: Getting Started with Sketches. 2nd edition. Simon Monk. McGraw Hill. ISBN-13: 978-1259641633
5. The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects. Chris Hackett. Weldon Owen; 2018. ISBN-13: 978-1681884325.

**E-RESOURCES:**

1. https://onlinecourses.nptel.ac.in/noc25_ee163/preview
2. https://onlinecourses-archive.nptel.ac.in/noc18_cs05/course
3. https://www.autodesk.com/learn/ondemand/collection/fusion-360

**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 3 | - | 2 | - | - | - | - | 1 | - |
| CO2 | 3 | 2 | 3 | 2 | 2 | - | - | - | - | 1 | - |
| CO3 | 3 | 3 | 3 | 2 | 3 | - | - | - | - | 2 | - |
| CO4 | 2 | 1 | 2 | - | 2 | - | - | - | - | 1 | - |
| CO5 | 3 | 3 | 3 | 2 | 3 | - | - | - | 2 | 3 | 2 |
| Avg | 3 | 2 | 3 | 2 | 2 | - | - | - | 2 | 2 | 2 |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| 25MDC11 | YOGA FOR HUMAN EXCELLENCE | L | T | P | C |
|---|---|---|---|---|---|
| SDG No. 3,4,5,10,16 | (Common to B.E./B.Tech. all Branches) | 0 | 0 | 1 | 0 |

COURSE OBJECTIVES:

- To introduce students to simpli ied physical exercises, breathing techniques, relaxation practices and Yogasanas for maintaining physical health and well-being.
- To develop awareness of body–mind coordination through the practice of Kaya Kalpa exercises, meditation and self-regulation techniques.
- To enhance concentration, emotional balance and mental peace through systematic training in meditation and mindfulness practices.
- To inculcate ethical values, self-discipline, responsibility and healthy lifestyle habits for holistic personality development.
- To promote individual and social harmony by fostering positive thinking, self-awareness and the application of yogic principles in daily life.

UNIT-I SIMPLIFIED PHYSICAL EXERCISES 3

Physical exercises: Hand exercises – Leg exercises. Breathing exercises: Eye exercises – Kapalabathi. Makarasana. Body massages: Acupressure – Relaxation.

UNIT-II KAYA KALPA 3

Kaya Kalpa Exercise – Aswini Mudra – Moola-Bandha – Ojas Breath (Kayakalpa Exercise should be learnt directly from the World Community Service Centre.)

UNIT-III MEDITATION 3

Agna. Santhi : Clearence. Thuriya. Thuriyatheetham meditation

UNIT-IV HUMAN RESOURCES DEVELOPMENT 3

Roles and responsibilities of a human being (Due the Duty, 4 Ashramas ) - Desire Alignment (Aasai seeramaithal) - Discipline (olukkam formula) - Diet/Food control (Organ Clock) - Five duties, Five limitations ( Ivaghai kadamaighal, Indhil Alavu murai) - Bene its of Blessings (comparing to Law of attraction )- Individual peace leads to world peace.

UNIT-V YOGASANAS 3

Suriya Namaskar, Padmasana, Vajrasana, Sukasana, Trikonasana , Saral matsyasana, Gomugasana, Mandukasana, Arthamatsyendrasana, Ushtrasana, Siddhasana, Shavasana

TOTAL : 15 PERIODS



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COURSE OUTCOMES:
At the end of the course,

CO1: Demonstrate simplified physical exercises, breathing techniques, relaxation methods, and acupressure practices to promote physical fitness and health.

CO2: Practice Kaya Kalpa exercises and related techniques to improve vitality, self-control, and overall well-being.

CO3: Apply meditation techniques to enhance concentration, emotional stability, mental clarity, and inner peace.

CO4: Analyze and adopt ethical values, self-discipline, healthy lifestyle habits, and social responsibilities for holistic personality development.

CO5: Perform Yogasanas effectively and integrate yogic principles into daily life for achieving physical, mental, and social well-being.

TEXT BOOKS:

1. Yoga Practices – I: VISION, Vethathiri Publications.
2. Yogasana – Vethathiri Publications

REFERENCE BOOKS:

1. Simpli ied Physical Exercises – Vethathiri Publications.
2. Sound Health Through Yoga – Dr. K. Chandrasekaran.

E. RESOURCES:

- https://www.vethathiri.edu.in/
- https://www.kundaliniyoga.edu.in/

COs-POs-PSOs MAPPING :

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 1 | - | - | - | - | - | 1 | 2 | - | - | - | - | - | - |
| CO2 | 1 | - | - | - | - | - | - | 2 | - | - | - | - | - | - |
| CO3 | 1 | - | - | - | - | - | - | 3 | - | - | - | - | - | - |
| CO4 | - | 1 | - | - | - | 2 | 1 | 3 | 1 | 1 | - | - | - | - |
| CO5 | 1 | - | - | - | - | 1 | 1 | 3 | - | - | - | - | - | - |
| 1.2 | 1.00 | 1.00 | - | - | - | 1.50 | 1.00 | 2.60 | 1.00 | 1.00 | - | - | - | - |

Low, 2- Medium, 3-High, "-" No Correlation



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| | | | | | | |
|---|---|---|---|---|---|---|
| 25ENI21 | COMMUNICATIVE ENGLISH – II | L | T | P | C |
| SDG No. 4,5,8.9,16 | (Common to B.E./B.Tech. All Branches) | 2 | 0 | 2 | 3 |

COURSE OBJECTIVES:

- To develop the learners' fundamental communication skills by introducing basic grammar, everyday conversations, and descriptive writing.
- To enable learners to understand and apply advanced grammar structures, enhance their listening skills for process comprehension, improve presentation abilities, read technical documents, and write formal complaint and editorial letters.
- To equip learners with essential communication skills for interviews, group discussions, debates, and professional correspondence.
- To develop learners' skills in reported speech, descriptive speaking, review listening, fluent reading, and formal correspondence.
- To prepare learners for job interviews, professional speaking, resume writing, and job-related communication.

UNIT-I INTRODUCTION TO EFFECTIVE COMMUNICATION 6+3

Grammar : Prefix/ Suffix- Active and Passive Voice- Model Passive

Listening : Listening to Short literary Texts - Listening to a Presentation and Completing Gap Filling Exercise

Speaking : Talking about Daily Routine, Hobbies, Favorites, Family, etc.

Reading : Describing a Product through Comparing & Contrasting it with other Products

Writing : Writing a short biography on Achievers based on given hints.

UNIT-II PROCESS COMMUNICATION AND TECHNICAL WRITING 6+3

Grammar : Subject - Verb Agreement -Infinitives - Gerunds

Listening : Listening to Process Description and Drawing a Flow Chart

Speaking : General and Technical Presentation.

Reading : Reading Technical Manuals.

Writing : Writing Complaint Letter to Companies - Letter to the Editor.



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UNIT-III ADVANCED COMMUNICATION FOR PROFESSIONAL SUCCESS 6+3

Grammar : If Clause -One Word Substitution

Listening : Listening to Interview Techniques and Etiquettes

Speaking : Participating in Group Discussion - Developing Persuasive Skills and Argument Construction (Debate)

Reading : Reading of Articles (Editorials)

Writing : Compose Emails for Internship Request, Placement Enquires and Industrial Visits

UNIT-IV DESCRIPTIVE AND INTERACTIVE COMMUNICATION 6+3

Grammar : Reported Speech - Compound Words

Listening : Listening to Book and Movie Review

Speaking : Describing Working Mechanism

Reading : Reading for Improving Fluency and Intonation.

Writing : Writing letter of Invitation, Acceptance and Declination

UNIT-V CAREER-ORIENTED COMMUNICATION SKILLS 6+3

Grammar : Content vs. Function Words – Fixed & Semi Fixed Expression - Relative Phrase

Listening : Listening to job Interviews and Answering to the Exercise

Speaking : Offline and Online Interviews.

Reading : Matching the Heading to the Paragraph.

Writing : Job Application & Internship Application with Resume.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

At the end of the Course the students will able to

CO 1: Apply basic grammar, communicate daily situations, comprehend listening tasks, compare products and write short biographies.

CO 2: Correct grammar, present processes effectively, interpret technical texts and draft form



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letters.

CO 3: Use conditional sentences, participate confidently in debates and discussions, follow interview protocols, analyze editorials and compose professional emails.

CO 4: Use reported speech, describe processes, listen and respond to reviews, read with fluency and draft formal invitation letters.

CO 5: Apply grammar structures, face interviews confidently, match texts with headings, and draft job applications with resumes.

TEXT BOOKS:

1. Department of English, Anna University, "English for Engineers & Technologists" Orient Blackswan Private Ltd, 2020.
2. Dr.Veena Selvam, Dr.Sujatha Priyadarshini, & CO, Department of English, Anna University, "English for Science & Technology" Cambridge University Press, 2021.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma, "Technical Communication–Principles and Practices", Oxford Univ. Press, New Delhi, 2016.
2. Lakshminarayanan, "A Course Book on Technical English", Scitech Publications (India) Pvt.Ltd. 2012.
3. Aysha Viswamohan, "English For Technical Communication (With CD)". Mcgraw HillEducation, ISBN : 0070264244, 2008.
4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House, 2016.

E. RESOURCES:

- https://learnenglish.britishcouncil.org/

CO's-PO's MAPPING :

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | - | - | - | - | 3 | 3 | - | 3 | - | - | - |
| CO2 | - | - | - | - | - | - | - | 3 | 3 | - | 3 | - | 1 | - |
| CO3 | - | - | - | - | - | - | - | 3 | 3 | - | 2 | - | 1 | - |
| CO4 | - | - | - | - | - | - | - | 3 | 3 | - | 2 | - | - | - |
| CO5 | - | - | - | - | - | - | - | 3 | 3 | - | 2 | - | - | - |
| AVR | - | - | - | - | - | - | - | 3.00 | 3.00 | - | 2.40 | - | 1.00 | - |

1- Low, 2- Medium, 3-High, "-" No Correlation



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| | | L | T | P | C |
|---|---|---|---|---|---|
| 25MAT31 | DISCRETE MATHEMATICS AND | | | | |
| SDG NO.4,8,9,17 | COMPUTATIONAL STRUCTURES | 3 | 1 | 0 | 4 |

(for B.E. /B.Tech - CSE, IT, AIDS, AIML & Cyber -Security)

COURSE OBJECTIVES:

- To enhance student's logical and mathematical maturity and their ability to deal with abstraction.
- To introduce fundamental combinatorial principles for solving mathematical computational problems.
- To understand the basic concepts of graphs and graph models.
- To familiarize students with the applications of algebraic structures.
- To understand the concepts and significance of lattices and Boolean algebra, which are widely used in computer science and engineering.

UNIT-I LOGIC AND PROOFS 9+3

Propositional logic –Propositional equivalences –Predicates and quantifiers – Nested quantifiers– Rules of inference - Introduction to proofs – Consistency of premises and Indirect method of proof.

UNIT-II COMBINATORICS 9+3

Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations–Inclusion and exclusion principle and its applications.

UNIT-III GRAPHS AND GRAPH MODELS 9+3

Graphs and graph models–Graph terminology and special types of graphs–Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT-IV ALGEBRAIC STRUCTURES 9+3

Algebraic systems–Semi groups and monoids – Groups – Subgroups –Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.



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UNIT-V LATTICES AND BOOLEAN ALGEBRA 9+3

Partial ordering- Posets - Lattices as posets – Properties of lattices– Lattices as algebraic systems – Sublattices – Direct product and homomorphism – Some special lattices- Boolean algebra-Sub Boolean Algebra .

TOTAL : 60 PERIODS

COURSE OUTCOMES:

At the end of the course, students would be able :

CO1: To apply propositional logic, rules of inference, and proof techniques to analyze and construct valid mathematical arguments.

CO2: To model and solve combinatorial and computational problems.

CO3: To apply graph concepts and representations to analyze graphs and graph models.

CO4: To analyze algebraic structures and apply related concepts to solve problems in abstract algebra.

CO5: To analyze algebraic structures, identify lattice properties and solve problems involving special lattices and sub-Boolean algebras.

TEXT BOOKS:

1. Rosen.K.H.,"DiscreteMathematicsanditsApplications",7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2017.
2. Tremblay. J.P. and Manohar. R, "Discrete Mathematical Structures with Applications to Computer Science", Tata Mc Graw Hill Pub. Co. Ltd, New Delhi, 30th Reprint, 2011.

REFERENCE BOOKS:

1. Grimaldi.R.P."Discrete and Combinatorial Mathematics :An Applied Introduction , 5th Edition, Pearson Education Asia, Delhi, 2013.
2. Koshy.T."Discrete Mathematics with Applications", Elsevier Publications,2006.
3. Lipschutz. S. and Mark Lipson., "Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub. Co. Ltd., New Delhi, 3rd Edition, 2010.

E-RESOURCES:

1. https://www.youtube.com/watch?v=FMh8qNV3PHk
2. https://onlinecourses.nptel.ac.in/noc23_cs22/preview



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3. https://www.youtube.com/watch?v=HipVU5vz3Q8&list=PLU6SqdYcYsfLV24T0XVb3z3mjl8QG0EBN

CO's – PO's & PSO's MAPPING:

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PS01 | PS02 | PS03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | - | - | - | 2 | - | - | 2 | 1 | 3 | 2 |
| CO2 | 3 | 3 | 2 | 2 | - | - | - | 2 | - | - | 2 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 2 | 2 | - | - | - | 3 | - | - | 2 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 2 | 2 | - | - | - | 2 | - | - | 2 | 2 | 3 | 1 |
| CO5 | 3 | 2 | 2 | 2 | - | - | - | 2 | - | - | 2 | 1 | 3 | 1 |
| AVG | 3.00 | 2.80 | 2.00 | 2.00 | - | - | - | 2.20 | - | - | 2.00 | 2.00 | 3.00 | 2.00 |

1 - low, 2 - medium, 3 - high, '-' - no correlation.



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25CRI31
SDG No.9,16

## FOUNDATIONS OF CYBER SECURITY

| L | T | P | C |
|---|---|---|---|
| 3 | 0 | 2 | 4 |

**COURSE OBJECTIVES:**

- To learn cybercrime and cyber law.
- To understand the cyber attacks and tools for mitigating them.
- To understand information gathering.
- To learn how to detect a cyber attack.
- To learn how to prevent a cyber attack.

**UNIT-I** **INTRODUCTION** **9**

Cyber Security – History of Internet – Impact of Internet – CIA Triad; Reason for Cyber Crime – Need for Cyber Security – History of Cyber Crime; Cybercriminals – Classification of Cybercrimes – A Global Perspective on Cyber Crimes; Cyber Laws – The Indian IT Act – Cybercrime and Punishment.

**UNIT II** **ATTACKS AND COUNTER MEASURES** **9**

OSWAP; Malicious Attack Threats and Vulnerabilities: Scope of Cyber-Attacks – Security Breach – Types of Malicious Attacks – Malicious Software – Common Attack Vectors – Social engineering Attack – Wireless Network Attack – Web Application Attack – Attack Tools – Countermeasures.

**UNIT III** **RECONNAISSANCE** **9**

Harvester – Whois – Netcraft – Host – Extracting Information from DNS – Extracting Information from E-mail Servers – Social Engineering Reconnaissance; Scanning – Port Scanning – Network Scanning and Vulnerability Scanning – Scanning Methodology – Ping Sweer Techniques – Nmap Command Switches – SYN – Stealth – XMAS – NULL – IDLE – FIN Scans – Banner Grabbing and OS Finger printing Techniques.

**UNIT IV** **INTRUSION DETECTION** **9**

Host -Based Intrusion Detection – Network -Based Intrusion Detection – Distributed or Hybrid Intrusion Detection – Intrusion Detection Exchange Format – Honeypots – Example System Snort.

**UNIT V** **INTRUSION PREVENTION** **9**

Firewalls and Intrusion Prevention Systems: Need for Firewalls – Firewall Characteristics and Access Policy – Types of Firewalls – Firewall Basing – Firewall Location and Configurations – Intrusion Prevention Systems – Example Unified Threat Management Products.

**TOTAL : 45 PERIODS**

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**PRACTICAL EXERCISES**

1. Install Kali Linux on Virtual box
2. Explore Kali Linux and bash scripting
3. Perform open source intelligence gathering using Netcraft, Whois Lookups, DNS Reconnaissance, Harvester and Maltego
4. Understand the nmap command and scan a target using nmap
5. Install metasploitable2 on the virtual box and search for unpatched vulnerabilities
6. Use Metasploit to exploit an unpatched vulnerability
7. Install Linux server on the virtual box and install ssh
8. Use Fail2banto scan log files and ban Ips that show the malicious signs
9. Launch brute-force attacks on the Linux server using Hydra.
10. Perform real-time network traffic analysis and data pocket logging using Snort

**TOTAL: 30 PERIODS**
**TOTAL: 75(45+30)PERIODS**

**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

**CO1 :** Explain the basics of cyber security, cyber crime and cyber law (K2)

**CO2 :** Classify various types of attacks and learn the tools to launch the attacks (K2)

**CO3 :** Apply various tools to perform information gathering (K3)

**CO4 :** Apply intrusion techniques to detect intrusion (K3)

**CO5 :** Apply intrusion prevention techniques to prevent intrusion (K3)

**TEXT BOOKS:**

1. Anand Shinde, "Introduction to Cyber Security Guide to the World of Cyber Security", Notion Press, 2021.
2. Nina Godbole, Sunit Belapure, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley Publishers, 2011.

**REFERENCE BOOKS:**

1. David Kim, Michael G. Solomon, "Fundamentals of Information Systems Security", Jones & Bartlett Learning Publishers, 2013 (Unit 2)
2. Patrick Engebretson, "The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made easy", Elsevier, 2011 (Unit 3)
3. Kimberly Graves, "CEH Official Certified Ethical hacker Review Guide", Wiley Publishers, 2007 (Unit 3)

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4. William Stallings, Lawrie Brown, "Computer Security Principles and Practice", Third Edition, Pearson Education, 2015 (Units 4 and 5)

5. Georgia Weidman, "Penetration Testing: A Hands-On Introduction to Hacking", No Starch Press, 2014 (Lab)

**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 1 | 2 | 2 | - | - | 1 | 1 | 3 | 2 | 1 | 3 | 2 |
| CO2 | 2 | 1 | 2 | 2 | 2 | - | - | 3 | 2 | 2 | 1 | 1 | 2 | 1 |
| CO3 | 1 | 1 | 1 | 3 | 3 | - | - | 1 | 2 | 1 | 1 | 3 | 3 | 2 |
| CO4 | 1 | 1 | 1 | 2 | 2 | - | - | 2 | 3 | 3 | 3 | 3 | 1 | 3 |
| CO5 | 3 | 1 | 3 | 1 | 3 | - | - | 3 | 1 | 2 | 2 | 2 | 2 | 2 |
| **AVG** | **2** | **1.4** | **1.6** | **2** | **2.4** | **-** | **-** | **2** | **1.8** | **2.2** | **1.8** | **2** | **2.2** | **2** |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| | | L | T | P | C |
|---|---|---|---|---|---|
| 25CSI31<br>SDG No: 4, 8, 9, 12,17 | **OPERATING SYSTEMS**<br>(for B.E./B.Tech. –CSE, IT,AIDS,AIML and CS) | 3 | 0 | 2 | 4 |

**COURSE OBJECTIVES:**

- To understand the basic concepts, structure, and functions of operating systems.
- To learn process management, threads, CPU scheduling, and synchronization techniques.
- To study concurrency control mechanisms and deadlock handling methods.
- To understand memory management techniques such as paging, segmentation, and virtual memory.
- To learn I/O management, disk scheduling, file systems, and secondary storage management concepts.

**UNIT-I** **OPERATING SYSTEM OVERVIEW** **9**

Objectives and functions of OS - Evolution of OS - -System call - Virtual machine-Symmetric Multiprocessing - Microkernel- Multiprocessor and Multicore Organization- OS Design Considerations for Multiprocessor and Multicore.

**UNIT-II** **PROCESS SCHEDULING** **9**

Process – Process States – Process description. Threads: Processes and Threads- Types of Threads- Uniprocessor Scheduling Types of Processor Scheduling - Scheduling Algorithms: FCFS, SPN, SRT, Round Robin, Priority, Multi-Level Queue.

**UNIT-III** **MUTUAL EXCLUSION AND SYNCHRONIZATION** **9**

Principles of concurrency - Mutual exclusion: Software and hardware approaches - Semaphores - Monitors - Message Passing - Readers/ Writers problem. Deadlock and Starvation: Principles of deadlock - Deadlock Prevention - Deadlock Detection - Deadlock Avoidance.

**UNIT-IV** **MEMORY MANAGEMENT** **9**

Memory management requirements - Memory partitioning - Loading and Linking - Paging- Segmentation. Virtual Memory: Hardware and control structures – Virtual Memory Management Policies: Fetch Policy, Placement policy, Replacement policy- Resident set management - Cleaning policy - Load control.

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**UNIT-V** **I/O MANAGEMENT AND FILE MANAGEMENT** **9**

I/O devices - Organization of I/O function - OS design issues - I/O buffering - Disk scheduling.File management: Overview - File organization and access - File directories - File sharing - Record blocking-Secondary storage management.

**TOTAL: 45 PERIODS**

**PRACTICAL EXERCISES:**

1. System calls - fork, exec, getpid, exit, wait, close, stat, opendir, readdir.
2. I/O system calls -open, close, read, write, create, lseek, dup.
3. Simulate UNIX commands - ls, grep, chmod, passwd, who, date.
4. Shell programming.
   - Simple functions.
   - Basic tests.
   - Loops.
   - Patterns.
   - Expansions.
   - Substitutions.
5. Process Scheduling- FCFS, SJF, Priority and Round robin.
6. Synchronization using semaphores, Message Queues and Shared Memory.
7. Implementation of Interprocess Communication.
8. Implementation of memory management schemes –first fit, Best fit, worst fit and page replacement algorithms.

**TOTAL:30 PERIODS**

**TOTAL:75(45+30) PERIODS**

**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

**CO1:** Understand the objectives, functions, and design principles of operating systems and multiprocessing environments.

**CO2:** Apply process management concepts, threads, and CPU scheduling algorithms for process execution.

**CO3:** Analyze and implement synchronization, concurrency control, and deadlock handling techniques.

**CO4:** Demonstrate memory management techniques including paging, segmentation, and virtual memory.

**CO5:** Apply I/O management, disk scheduling, file organization, and secondary storage management concepts.

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**TEXT BOOKS:**

1 William Stallings, "Operating Systems Internals and Design Principles", Pearson Education, Ninth Edition, 2018.

**REFERENCE BOOKS:**

1. Silberchatz, Galvin, Gagne, "Operating System Concepts", John Wiley, Tenth Edition, 2018.
2. Dhananjay M. Dhamdhere, "Operating System a Concept Based Approach " McGraw Hill Publication, Third Edition ,2017.

**E-RESOURCES:**

1.https://nptel.ac.in/courses/106108101

2.https://nptel.ac.in/courses/106106144

**CO's – PO's & PSO's MAPPING**

| CO's | PO's | | | | | | | | | | | PSO's | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
| CO1 | 3 | 1 | 1 | 1 | - | - | - | - | 1 | 1 | 1 | 2 | 1 | 2 |
| CO2 | 2 | 3 | 1 | 3 | 1 | - | - | - | 3 | 2 | 2 | 3 | 3 | 1 |
| CO3 | 2 | 2 | 3 | 3 | 2 | - | - | - | 3 | 1 | 1 | 1 | 1 | 1 |
| CO4 | 2 | 2 | 1 | 2 | 1 | - | - | - | 1 | 3 | 2 | 1 | 1 | 2 |
| CO5 | 2 | 3 | 3 | 2 | 1 | - | - | - | 3 | 1 | 2 | 3 | 1 | 2 |
| **AVG** | **2.2** | **2.2** | **1.8** | **2.2** | **1.3** | **-** | **-** | **-** | **2.2** | **1.6** | **1.6** | **1.4** | **1.4** | **1.6** |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| 25CSI32<br>SDG No:4, 8, 9, 12,17 | DATA STRUCTURES<br>(for BE/B.Tech.–CSE ,IT,AIDS,AIML,CS and EEE) | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 2 | 4 |

**COURSE OBJECTIVES:**

- To understand the fundamentals of data structures, abstract data types, and algorithm complexity analysis.
- To learn array and linked list representations and their operations for efficient data storage and manipulation.
- To study stack and queue data structures and their applications in problem solving.
- To understand tree structures, tree traversal techniques, and priority queue implementations.
- To learn hashing techniques and graph traversal algorithms for efficient data processing.

**UNIT-I** **INTRODUCTION** **8**

Need for data structures – Types of data structures – Abstract Data Type – Algorithm complexity analysis of linear and non-linear data structures – Best case and worst-case complexities – Asymptotic notations.

**UNIT-II** **ARRAYS AND LISTS** **8**

Array representation and operations – Matrix representation using multi-dimensional arrays – Linked list representation – Operations on singly linked list – Types of linked list – Polynomial addition – Sparse matrices.

**UNIT-III** **STACKS AND QUEUES** **9**

Stack ADT – Representation and operations – Expressing handling – Role of stack in implementing recursive algorithms – Queue ADT – Representation and operations – Types of queues – Circular queue – Dequeue – Priority queue.

**UNIT-IV** **TREES** **10**

Terminologies – Binary Tree – Traversal – Expression trees – Binary Heap – Priority queue implementation using Binary Heap – Binary Search Tree – AVL Tree – m-way search trees – B Tree – B+ Tree – Application – Tree structure.

**UNIT-V** **HASHING AND GRAPHS** **10**

Hash table – Hash functions – Resolving collisions – Rehashing. GRAPHS: Graph terminologies – Types of graphs – Representation – Breadth First Search – Depth First Search – Topological sort.

**TOTAL : 45 PERIODS**

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**PRACTICALS:**

1. Solving problems using arrays.
2. Searching and Sorting algorithms.
3. Implementation of linked list.
4. Applications of linked list.
5. Implementation of stack and queue.
6. Applications of stack.
7. Operations on Binary Search Trees.
8. Applications of Binary Search Tree, AVL tree.
9. Graphs – Depth First Search and Breadth First Search.
10. Hashing and Collision Resolution.

**TOTAL:30 PERIODS**

**TOTAL:75(45+30) PERIODS**

**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

**CO1 :** Explain the concepts of data structures, abstract data types, and algorithm complexity analysis.

**CO2 :** Apply array and linked list operations for solving data organization and manipulation problems.

**CO3 :** Implement stack and queue operations and apply them in recursive and scheduling applications.

**CO4 :** Analyze and implement tree structures, binary heaps, binary search trees, AVL trees, and B-trees.

**CO5 :** Apply hashing techniques and graph traversal algorithms such as BFS, DFS, and topological sorting for problem solving.

**TEXT BOOKS:**

1. Mark Allen Weiss, 'Data Structures and Algorithm Analysis in C'. 2nd Edition, Pearson Education, 2019.
2. Jean Paul Tremblay, Sorenson, 'An Introduction to Data Structures with Applications'. 2nd Edition, McGraw Hill Publishing Company, New Delhi, 2017.

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**REFERENCE BOOKS:**

1. Amol M. Jagtap, Ajit S. Mali, 'Data Structures Using C – A Practical Approach for Beginners'. Chapman and Hall/CRC, 1st edition, 2021.
2. Aaron M Tanenbaum, Moshe J Augenstein and Yedidyah Langsam, 'Data Structures Using C and C++'. 2nd edition, Prentice Hall, 2021.

**E-RESOURCES:**

1. https://nptel.ac.in/courses/106102064
2. https://onlinecourses.nptel.ac.in/noc25_cs81/preview

**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 3 | 1 | 2 | 2 | 1 | - | 1 | 2 | 1 | 3 | 2 | 1 | 3 |
| CO2 | 1 | 2 | 1 | 2 | 2 | - | - | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| CO3 | 2 | 3 | 1 | 2 | 3 | - | - | 1 | 1 | 1 | 2 | 2 | 1 | 2 |
| CO4 | 2 | 1 | - | 1 | 1 | - | - | 2 | 1 | 1 | 2 | 2 | 3 | 1 |
| CO5 | 1 | 2 | 1 | 2 | 2 | 1 | - | 1 | 2 | 1 | 3 | 2 | 2 | 3 |
| **AVG** | **1.6** | **2.2** | **1** | **1.8** | **2** | **1** | **-** | **1.2** | **1.4** | **1** | **2.4** | **2** | **1.8** | **2.2** |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| 25CSI33<br>SDG No. 4,8,9,12,17 | JAVA PROGRAMMING<br>(for BE/B.Tech. –CSE ,IT,AIDS,AIML and CS) | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 2 | 4 |

**COURSE OBJECTIVES:**

- To understand the fundamentals of Java programming and object-oriented concepts.
- To learn exception handling mechanisms and multithreaded programming in Java.
- To study GUI development using Swing and event handling techniques.
- To understand Java collections framework and data manipulation techniques.
- To learn database connectivity using JDBC for Java applications.

**UNIT-I** **INTRODUCTION TO JAVA** **8**

Java and Internet - Byte Code - Features of Java - Java Development Environment- Java Programming: Methods and Classes- Constructor - Garbage Collection - Overloading - Inheritance - Overriding -Packages and Interfaces - Java I/O systems -String Handling : String, String Buffer and StringBuilder.

**UNIT-II** **EXCEPTION HANDLING** **8**

Exception Handling: Fundamentals of Exception handling and types - Built in Exceptions - User defined Exceptions.

**UNIT-III** **THREADS** **9**

Multithreaded Programming : Thread Model - The Main Thread - Creating a Thread - Creating Multiple Threads – Thread priorities - Synchronization - Inter thread communication.

**UNIT-IV** **SWING AND EVENT HANDLING** **10**

Introduction to Abstract Window Tool kit - Swing class : Key Swing features – J Component – Swing Menu Basics – Model view Controller Architecture- Event Handling: The Delegation Event Model -Event class: Keyboard and Mouse events handling.

**UNIT-V** **COLLECTIONS FRAMEWORK AND DATABASE CONNECTIVITY** **10**

Collections overview- Collections Classes – Spliterator - Working with maps - Comparators – Arrays - Data Base Connectivity: basic structure of JDBC API.

**TOTAL : 45 PERIODS**

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**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 1 | 1 | 3 | 1 | 3 | - | - | 3 | 2 | 2 | 2 | 3 | 1 | 2 |
| CO2 | 2 | 1 | 3 | 2 | 1 | - | - | 2 | 1 | 1 | 3 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 1 | 2 | 2 | - | - | 3 | 2 | 1 | 2 | 3 | 1 | 3 |
| CO4 | 3 | 1 | 2 | 2 | 2 | - | - | 1 | 2 | 1 | 3 | 3 | 1 | 1 |
| CO5 | 1 | 1 | 2 | 3 | 2 | - | - | 3 | 2 | 1 | 2 | 3 | 3 | 3 |
| **AVG** | **2** | **1.4** | **2.2** | **2** | **2** | **-** | **-** | **2.4** | **1.8** | **1.2** | **2.4** | **3** | **1.8** | **2.2** |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| | | L | T | P | C |
|---|---|---|---|---|---|
| 25ECI31 | DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION | | | | |
| SDG 4,8,9 | (BE/B.Tech-Common to CSE, AI&DS, IT, Cyber security, AIML) | 3 | 0 | 2 | 4 |

**COURSE OBJECTIVES:**

- Analyze and design combinational circuits
- Analyze and design sequential circuits
- Understand the basic structure and operation of a digital computer.
- Study the design of data path unit, control unit for processor and to familiarize with the hazards.
- Understand the concept of various memories and I/O interfacing.

**UNIT-I COMBINATIONAL LOGIC** 9

Combinational Circuits – Karnaugh Map - Analysis and Design Procedures – Binary Adder – Subtractor – Decimal Adder - Magnitude Comparator – Decoder – Encoder – Multiplexers - Demultiplexers

**UNIT-II SEQUENTIAL LOGIC CIRCUITS** 9

Introduction to Sequential Circuits – Flip-Flops – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design – Moore/Mealy models, state minimization, state assignment, circuit implementation - Registers – Counters.

**UNIT-III COMPUTER FUNDAMENTALS** 9

Functional Units of a Digital Computer: Von Neumann Architecture – Operation and Operands of Computer Hardware Instruction – Instruction Set Architecture (ISA): Memory Location, Address and Operation – Instruction and Instruction Sequencing – Addressing Modes, Encoding of Machine Instruction – Interaction between Assembly and High Level Language.

**UNIT-IV DATAPATH AND CONTROL DESIGN** 9

Building a Data Path – ALU-Designing a Control Unit – Hardwired Control, Microprogrammed Control – Pipelining – Data Hazard – Control Hazards.

**UNIT-V MEMORY AND I/O** 9

Memory Concepts and Hierarchy – Memory Management – Cache Memories: Mapping and Replacement Techniques – Virtual Memory – DMA – I/O – Accessing I/O: Parallel and Serial Interface – Interrupt I/O – Interconnection Standards: USB, SATA

**TOTAL: 45 PERIODS**

**PRACTICAL EXERCISES:**

1. Design and implementation of half adder and full adder
2. Design and implementation of half subtractor and full subtractor
3. Implementation of code converters



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4. Implementation of encoder and decoder circuits
5. Implementation of functions using Multiplexers.
6. Implementation of the synchronous and asynchronous counters
7. Implementation of a Universal Shift register.

**PRACTICAL: 30 PERIODS**
**TOTAL (45+30): 75 PERIODS**

**COURSE OUTCOMES:**

**At the end of the course, the students will be able to**

**CO1:** Design various combinational digital circuits using logic gates.

**CO2:** Design sequential circuits and analyze the design procedures.

**CO3:** State the fundamentals of computer systems and analyze the execution of an instruction.

**CO4:** Analyze different types of control design and identify hazards.

**CO5:** Identify the characteristics of various memory systems and I/O communication.

**TEXT BOOKS:**

1. M. Morris Mano, Michael D. Ciletti, "Digital Design : With an Introduction to the Verilog HDL, VHDL, and System Verilog", Sixth Edition, Pearson Education, 2018.
2. David A. Patterson, John L. Hennessy, "Computer Organization and Design, The Hardware/Software Interface", Sixth Edition, Morgan Kaufmann/Elsevier, 2020.

**REFERENCE BOOKS:**

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, "Computer Organization and Embedded Systems", Sixth Edition, Tata McGraw-Hill, 2012.
2. William Stallings, "Computer Organization and Architecture – Designing for Performance", Tenth Edition, Pearson Education, 2016.
3. M. Morris Mano, "Digital Logic and Computer Design", Pearson Education, 2016.

**E-RESOURCES:**

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/

**CO's – PO's & PSO's MAPPING**

| CO/ PO/ PSO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 |
| CO3 | 3 | 3 | 3 | 3 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 1 |
| CO4 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 |
| CO5 | 3 | 3 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| AVG | 3 | 3 | 3 | 3 | 1.8 | 1.6 | 1 | 1 | 1 | 1 | 1.6 | 1.4 | 2.6 | 1.6 |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**



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| 25MDC34 | DISASTER RISK REDUCTION AND MANAGEMENT | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 0 |

**COURSE OBJECTIVES:**

- To impart knowledge on concepts related to disaster, disaster risk reduction, disaster management
- To acquaint with the skills for planning and organizing disaster response
- To develop disaster response skills by adopting relevant tools and technology
- To Enhance awareness of institutional processes for Disaster response in the country
- To Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

**UNIT-I HAZRADS, VULNERABILITY AND DISASTER RISKS 9**

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Types of Disasters: Natural, Human induced, Climate change induced –Earthquake, Landslide, Flood, Drought, Fire etc – Technological disasters- Structural collapse, Industrial accidents, oil spills -Causes, Impacts including social, Economic, political, environmental, health, psychosocial, etc.- Disaster vulnerability profile of India and Tamil Nadu - Global trends in disasters: urban disasters, pandemics, Complex emergencies, - Inter relations between Disasters and Sustainable development Goals

**UNIT-II DISASTER RISK REDUCTION (DRR) 9**

Sendai Framework for Disaster Risk Reduction, Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community Based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions / Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Early Warning System – Advisories from Appropriate Agencies.- Relevance of indigenous Knowledge, appropriate technology and Local resources.

**UNIT-III DISASTER MANAGEMENT 9**

Components of Disaster Management – Preparedness of rescue and relief, mitigation, rehabilitation and reconstruction- Disaster Risk Management and post disaster management – Compensation and Insurance- Disaster Management Act (2005) and Policy - Other related policies, plans, programmers and legislation - Institutional Processes and Framework at State and Central Level- (NDMA –SDMA-DDMA-NRDF- Civic Volunteers)

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**UNIT-IV** **TOOLS AND TECHNOLOGY FOR DISASTER MANAGEMENT** **9**

Early warning systems -Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment. - Elements of Climate Resilient Development –Standard operation Procedure for disaster response – Financial planning for disaster Management

**UNIT-V** **DISASTER MANAGEMENT: CASE STUDIES** **9**

Discussion on selected case studies to analyse the potential impacts and actions in the contest of disasters-Landslide Hazard Zonation: Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.- Field work-Mock drill -

**TOTAL : 45 PERIODS**

**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

**CO1 :** To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)

**CO2 :** To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction

**CO3 :** To develop disaster response skills by adopting relevant tools and technology

**CO4 :** Enhance awareness of institutional processes for Disaster response in the country and

**CO5 :** Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity

**TEXT BOOKS:**

1. Taimpo (2016), Disaster Management and Preparedness, CRC Publications
2. Singh R (2017), Disaster Management Guidelines for earthquakes, Landslides, Avalanches and tsunami, Horizon Press Publications
3. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
4. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]

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**REFERENCE BOOKS:**

1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005.
2. Government of India, National Disaster Management Policy, 2009.
3. Shaw R (2016), Community based Disaster risk reduction, Oxford University Press

**E-RESOURCES:**

1. https://archive.nptel.ac.in/courses/124/107/124107010/
2. https://nptel.ac.in/courses/124107010

**CO's – PO's & PSO's MAPPING**

| | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PSO 1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 3 | - | - | 2 | 2 | - | - | 2 | 2 | - | 1 |
| CO2 | 3 | 3 | 3 | 3 | - | - | 2 | 1 | - | - | 2 | 2 | | 1 |
| CO3 | 3 | 3 | 3 | 3 | - | - | 2 | 2 | - | - | - | 2 | | 1 |
| CO4 | 3 | 3 | 2 | 3 | - | - | 2 | 1 | - | - | 2 | 2 | | 1 |
| CO5 | 3 | 3 | 2 | 3 | - | - | 2 | 2 | - | - | 2 | 3 | | 1 |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| | | L | T | P | C |
|---|---|---|---|---|---|
| 25MAT41<br>SDG NO.2,4,8,9,12 | PROBABILITY THEORY AND STATISTICAL METHODS (for B.E. /B.Tech – BME, BT, PT, CSE, IT, AIDS, AIML & Cyber -Security) | 3 | 0 | 0 | 3 |

COURSE OBJECTIVES:

- To introduce core probability concepts such as axioms, conditional probability, and Bayes' theorem, while equipping students to handle random variables and their properties, including moments and generating functions.
- To enable students to understand, apply, and interpret standard probability distributions in various real-world scenarios and to introduce the basic concepts of one-dimensional random variables.
- To understand the relationship between multiple random variables and derive marginal and conditional distributions from joint distributions.
- To introduce the basic concepts and classifications of the design of experiments, which play an important role in the fields of engineering and statistical quality control.
- To equip learners with the skills to monitor, analyze, and maintain process stability by detecting variations in manufacturing or production data.

UNIT-I PROBABILITY AND RANDOM VARIABLES 9

Axioms of probability – Conditional probability – Baye's theorem – Discrete and continuous random variables – Moments – Moment generating functions.

UNIT-II DISTRIBUTION FUNCTIONS 9

Discrete distributions – Binomial, Poisson and Geometric, Continuous distributions – Uniform, Exponential and Normal distributions.

UNIT-III TWO-DIMENSIONAL RANDOM VARIABLES 9

Joint distributions– Marginal and conditional distributions– Covariance –Correlation.



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UNIT-IV DESIGN OF EXPERIMENTS 9

One way and two way classifications - Completely randomized design – Randomized block design - Latin square design.

UNIT-V STATISTICAL QUALITY CONTROL 9

Control charts for measurements ( $\bar{X}$ and R charts ) – Control charts for attributes ( p, c and np charts) – Tolerance limits.

TOTAL : 45 PERIODS

COURSE OUTCOME:

At the end of the Course the students will be able to

CO1: Understand and apply the axioms of probability, conditional probability and Bayes' theorem to solve problems, and analyze discrete and continuous random variables using moments and moment generating functions.

CO2: Compute probabilities using discrete and continuous distributions, including use of parameters and standardization for the Normal distribution.

CO3: Analyze bivariate random variables using joint, marginal, and conditional distributions, compute and interpret covariance and correlation between variables.

CO4: Apply the basic concepts of classifications of design of experiments in the field of agriculture.

CO5: construct, interpret, and use appropriate control charts for variables and attributes, and relate control limits to tolerance limits and process capability in statistical quality control.

TEXT BOOKS:

1. Johnson. R.A., Miller. I and Freund. J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 9thEdition, 2016.
2. Milton. J.S. and Arnold. J. C., "Introduction to Probability and Statistics", Tata Mc Graw Hill, 4th Edition, 2007.
3. Grewal. B.S.," Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition, 2018.



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**REFERENCE BOOKS:**


1. Devore. J.L.," Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
2. Papoulis.A. and Unni Krishna pillai.S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India,4th Edition, New Delhi,2010.
3. Ross. S.M.," Introduction to Probability and Statistics for Engineers and Scientists", 5th Edition, Elsevier,2014.
4. Spiegel. M.R., Schiller .J and Srinivasan. R.A. ," Schaum's Outline of Theory and Problems of Probability and Statistics", Tata McGraw Hill Edition,4thEdition,2012.


**E-Resources :**

1. https://www.youtube.com/watch?v=V44v-aWTSYE&list=PLyqSpQzTE6M9JEOrchuG0by2TQn1NKBIS&index=1
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc24_ma30

**CO's– PO's & PSO's MAPPING :**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PS01 | PS02 | PS03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 1 | 1 | - | - | - | 2 | - | - | 3 | 2 | 3 | 2 |
| CO2 | 3 | 3 | 1 | 1 | - | - | - | 2 | - | - | 3 | 2 | 3 | 2 |
| CO3 | 3 | 3 | 1 | 1 | - | - | - | 2 | - | - | 3 | 2 | 3 | 3 |
| CO4 | 3 | 3 | 1 | 1 | - | - | - | 2 | - | - | 3 | 2 | 2 | 3 |
| CO5 | 3 | 3 | 1 | 1 | - | - | - | 2 | - | - | 3 | 3 | 3 | 3 |
| Avg | 3.00 | 3.00 | 1.00 | 1.00 | - | - | - | 2.00 | - | - | 3.00 | 2.20 | 2.80 | 2.60 |

1- Low, 2-Medium , 3-High, "-" No Correlation



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| 25CRT41<br>SDG No.<br>4,8,9,16 | **DIGITAL FORENSICS**<br>**for B.E-CSE(Cyber Security)** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| | | 3 | 0 | 0 | 3 |

**COURSE OBJECTIVES:**

- To learn cyber crime and forensics
- To become familiar with forensics tools
- To learn to analyze and validate forensics data
- To understand cyber laws and the admissibility of evidence with case studies
- To learn the vulnerabilities in network infrastructure with ethical hacking

**UNIT -I** **INTRODUCTION TO CYBER CRIME AND FORENSICS** **9**

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Role of ECD and ICT in Cybercrime - Classification of Cyber Crime. The Present and future of Cybercrime - Cyber Forensics -Steps in Forensic Investigation - Forensic Examination Process Types of CF techniques - Forensic duplication and investigation - Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition.

**UNIT- II** **EVIDENCE COLLECTION AND FORENSICS TOOLS** **9**

Processing Crime and Incident Scenes – Digital Evidence - Sources of Evidence -Working with File Systems. - Registry - Artifacts - Current Computer Forensics Tools: Software/ Hardware Tools - Forensic Suite - Acquisition and Seizure of Evidence from Computers and Mobile Devices Chain of Custody- Forensic Tools

**UNIT-III** **ANALYSIS AND VALIDATION** **9**

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics - Analysis of Digital Evidence - Admissibility of Evidence - Cyber Laws in India - Case Studies

**UNIT-IV** **ETHICAL HACKING** **9**

Introduction to Ethical Hacking - Footprinting and Reconnaissance - Scanning Networks Enumeration - System Hacking - Malware Threats – Sniffing – Email Tracking

**UNIT-V** **ETHICAL HACKING IN WEB** **9**

Social Engineering - Denial of Service - Session Hijacking - Hacking Web servers - Hacking Web Applications – SQL Injection - Hacking Wireless Networks - Hacking Mobile Platforms.

**TOTAL : 45 PERIODS**



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**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

**CO1:** Understand the basics of cyber crime and computer forensics.

**CO2:** Apply a number of different computer forensic tools to a given scenario.

**CO3:** Analyze and validate forensics data and understand Admissibility of evidence in India with Cyber laws and Case Studies.

**CO4:** Identify the vulnerabilities in a given network infrastructure.

**CO5:** Implement real-world hacking techniques to test system security

**TEXT BOOKS:**

1. Bill Nelson, Amelia Phillips, Christopher Steuart, — Guide to Computer Forensics and Investigations||, Cengage Learning, India Sixth Edition, 2019.
2. CEH official Certified Ethical Hacking Review Guide, Wiley India Edition, Version 11, 2021.
3. Dejey, S. Murugan - Cyber Forensics, Oxford University Press, India, 2018

**REFERENCES:**

1. John R.Vacca, "Computer Forensics ", Cengage Learning, 2005
2. MarjieT.Britz, "Computer Forensics and Cyber Crime: An Introduction 3rd Edition, Prentice Hall, 2013.
3. AnkitFadia " Ethical Hacking, Second Edition, Macmillan India Ltd, 2006
4. Kenneth C.Brancik "Insider Computer Fraud|| Auerbach Publications Taylor &Francis Group–2008.

**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | - | - | - | 1 | - | - | - | 2 | - | 3 | - |
| CO2 | 2 | 1 | 1 | 2 | - | - | - | - | - | - | 2 | 2 | 1 | 2 |
| CO3 | 2 | 2 | 1 | 1 | 2 | - | - | - | - | - | 1 | 3 | - | 2 |
| CO4 | - | - | - | - | - | - | 1 | - | - | - | 1 | - | 2 | - |
| CO5 | - | 3 | - | 2 | - | - | 1 | - | - | - | 2 | 2 | 1 | - |
| AVG | 2 | 2 | 1 | 2 | 2 | - | 1 | - | - | - | 2 | 2 | 2 | 2 |

**1-low, 2-medium, 3-high,'-'-nocorrelation**



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| 25CST43<br>SDG No. 4,9,16 | STANDARDS IN COMPUTER SCIENCE<br>(for BE/B.Tech. –CSE and CS) | L T P C<br>1 0 0 1 |
|---|---|---|

**COURSE OBJECTIVES:**

- To understand the fundamental concepts, principles, importance, and process of standardization in Computer Science and Information Technology.
- To familiarize students with major national and international standards related to software engineering, IT service management, Internet, web technologies, and cybersecurity.
- To develop awareness of professional standards, ethical practices, quality management, and information security frameworks used in the computing industry.

**UNIT-I** **OVERVIEW OF STANDARDS** **5**

**Basic concepts of standardization:** Purpose of Standardization, marking and certification of articles and processes; Importance of standards to industry, policy makers, trade, sustainability and innovation. Objectives, roles and functions of BIS, Bureau of Indian Standards Act, ISO/IEC Directives; WTO Good Practices for Standardization. Important Indian and International Standards.

**UNIT-II** **INTERNATIONAL STANDARDS IN COMPUTER SCIENCE** **5**

**Introduction** – Importance of standards in IT– Overview of key international standards organizations **ANSI and IEEE Standards** – ANSI standards for software engineering (e.g., ANSI/ISO/IEC 12207:2008 – Software Life Cycle Processes)– IEEE standards and their applications in software engineering (e.g., IEEE 830– 1998 – Requirements Specifications). **ISO/IEC 20000:** IT Service Management – Scope and requirements– Service delivery process– Certification and implementation challenges. **IETF Standards in Internet Protocols**– Overview of key IETF standards (e.g., RFC 791 for IPv4)– Evolution and adoption of internet protocols– **W3C Standards for the World Wide Web** – Key W3C standards (e.g., HTML5, CSS3, Web Accessibility Guidelines)– Role of standards in web development and interoperability.

**UNIT-III** **ISO/IEC 27001** **5**

**Information Security Management** – Principles and Framework– Risk assessment and Management– Controls and compliance– **NIST Standards and Frameworks** – NIST Cybersecurity Framework (CSF)NIST Special Publications (e.g., SP 800 series) for cybersecurity. **ACM Standards and Guidelines** – ACM Code of Ethics and Professional Conduct– ACM Computing Classification System (CCS) and its role in standardization.

**TOTAL:15 PERIODS**

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**OURSE OUTCOMES:**

**At the end of the course the students will be able to**

**CO1 :** Explain the fundamentals of standardization and the roles of major standards organizations such as BIS, ISO, IEC, ANSI, IEEE, and WTO.

**CO2 :** Describe and apply relevant software, IT service, telecommunications, Internet, web, and cybersecurity standards in computing applications.

**CO3 :** Evaluate the importance of quality, information security, professional ethics, and industry standards for responsible and sustainable computing practices.

**TEXT BOOKS:**

1. Hironori Washizaki (Ed.), Guide to the Software Engineering Body of Knowledge (SWEBOK Guide), Version 4.0, IEEE Computer Society, 2024; latest updated release Version 4.0a, 2025.
2. Alan Calder, ISO/IEC 27001:2022 – Information Security Management Systems: A Practical Guide, IT Governance Publishing.

   Note: ISO/IEC 27001:2022 is the current edition, with Amendment 1:2024.

**REFERENCE BOOKS:**

1. Bureau of Indian Standards (BIS), *Manual for Standards Formulation*, BIS, 2022.
2. Michael Kunas, Implementing Service Quality Based on ISO/IEC 20000: A Management Guide, IT Governance Publishing, 2012.

**E-RESOURCES:**

1. https://www.bis.gov.in/?utm_source=chatgpt.com
2. https://standards.ieee.org/?utm_source=chatgpt.com

**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 2 | 1 | - | - | 2 | 1 | 1 | 1 | 2 | 1 | 3 |
| CO2 | 3 | 1 | 1 | 1 | 1 | - | - | 2 | 3 | 3 | 3 | 3 | 1 | 2 |
| CO3 | 3 | 2 | 3 | 2 | 1 | - | - | 2 | 1 | 1 | 2 | 2 | 3 | 3 |
| CO4 | 1 | 2 | 3 | 2 | - | - | - | 3 | 2 | 3 | 3 | 1 | 2 | 3 |
| CO5 | 1 | 1 | 3 | 3 | 2 | - | - | 1 | 3 | 3 | 1 | 2 | 2 | 2 |
| AVG | 2 | 1.6 | 2.6 | 2 | 1.3 | - | - | 2 | 2 | 2.2 | 2 | 2 | 1.8 | 2.6 |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| 25CST44<br>SDG No. 4,8,9,12,16 | OBJECT ORIENTED SOFTWARE ENGINEERING<br>(for BE/B.Tech. –CSE,IT,AIDS,AIML and CS) | L<br>3 | T<br>0 | P<br>0 | C<br>3 |
|---|---|---|---|---|---|

**COURSE OBJECTIVES:**

- To understand the fundamental concepts, software processes, and life cycle models in software engineering.
- To learn requirements gathering, analysis, specification, and software modeling techniques.
- To understand software design principles, coding practices, and software quality metrics.
- To study software testing methods, testing levels, and quality assurance techniques.
- To learn software project estimation models and project management techniques.

**UNIT-I** **INTRODUCTION** **8**

Introduction – The Software problem – Software Engineering Problem – Software Engineering Approach – Software Process – Characteristics of a Software Process – Software Development Process –Software Life cycle models- Agile Software Development – Traditional Model vs. Agile Model - Classification of Agile Methods - Introduction to Agile process- SCRUM- Extreme Programming.

**UNIT-II** **SOFTWARE REQUIREMENTS AND ANALYSIS** **8**

Requirements Analysis and Specification - Requirements Gathering and Analysis- Value of good SRS - Requirement process- Requirement Specification - desirable characteristics, components and Structure of requirements document - Functional Specification with use cases - basics - DFDs - Data Dictionary –ER Diagram- Validation

**UNIT-III** **SOFTWARE DESIGN AND CODING** **9**

Design concepts - Cohesion and Coupling- Function-oriented Design –Object Oriented Design- Detailed Design – Verification – Metrics - Programming Principles and Guidelines – Incrementally Developing Code- Code inspection – Metrics

**UNIT-IV** **TESTING** **10**

Testing Fundamentals - Levels of Testing: Unit Testing - Integration Testing - System Testing - Acceptance Testing - Testing Process - Black Box Testing: Equivalence Class Partitioning - Boundary Value Analysis - White box Testing: Control Flow based criteria - Data Flow based Testing – Metrics

**UNIT-V** **SOFTWARE PROJECT MANAGEMENT** **10**

Software Project Estimation: Decomposition Techniques-COCOMO Model- Estimation for Object Oriented Projects- Specialized Estimation Techniques

**TOTAL : 45 PERIODS**

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**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

- **CO1 :** Explain software engineering principles, software processes, life cycle models, and agile development methodologies.
- **CO2 :** Apply requirements analysis, specification, and software modeling techniques for software development.
- **CO3 :** Design software systems using appropriate design principles, coding standards, and software metrics.
- **CO4 :** Analyze and apply software testing techniques, testing levels, and quality assurance methods.
- **CO5 :** Apply software project estimation and management techniques using models such as COCOMO for software projects.

**TEXT BOOKS:**

1. Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: Using UML, Patterns and Java", Third Edition, Pearson Education, 2009.
2. Roger S. Pressman, Object-Oriented Software Engineering: An Agile Unified Methodology, First Edition, Mc Graw-Hill International Edition, 2014.

**REFERENCE BOOKS:**

1. . Carlo Ghezzi, Mehdi Jazayeri, Dino Mandrioli, Fundamentals of Software Engineering, 2nd edition, PHI Learning Pvt. Ltd., 2010.
2. Craig Larman, Applying UML and Patterns, 3rd ed, Pearson Education, 2005.

**E-RESOURCES:**

1. https://online courses.nptel.ac.in/noc25_cs108/preview

**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 1 | 2 | 2 | - | - | - | 1 | 1 | 2 | 2 | 2 | 1 |
| CO2 | 2 | 3 | 2 | 3 | 2 | - | - | 2 | 2 | 3 | 2 | 3 | 2 | 1 |
| CO3 | 2 | 3 | 2 | 1 | 1 | - | - | 2 | 2 | 3 | 2 | 2 | 3 | 1 |
| CO4 | 2 | 3 | 2 | 2 | 3 | - | - | 2 | 2 | 3 | 2 | 2 | 3 | 1 |
| CO5 | 2 | 3 | 1 | 2 | 2 | - | - | - | - | - | 1 | 3 | 2 | 2 |
| **AVG** | **2** | **2.8** | **1.6** | **2** | **2** | **-** | **-** | **2** | **1.8** | **2.5** | **1.8** | **2.4** | **2.4** | **1.2** |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| 25CSI42<br>SDG No. 4,8,9,11,16 | **DATABASE MANAGEMENT SYSTEMS**<br>(for BE/B.Tech. –CSE, IT,AIDS,AIML and CS) | L<br>3 | T<br>0 | P<br>2 | C<br>4 |
|---|---|---|---|---|---|

**COURSE OBJECTIVES:**

- To learn the fundamentals of data models, relational algebra and SQL.
- To represent a database system using ER diagrams and to learn normalization techniques.
- To understand the fundamental concepts of transaction, concurrency and recovery processing To understand Turing machines and their capability.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To have an introductory knowledge about the Distributed databases, NOSQL and database security.

**UNIT-I** **INTRODUCTION TO DATABASES AND DBMS** **8**

Understanding Data and Information - Database vs DBMS - Modern Databases - DBMS Architecture and Components - Data Models - Relational Model - Codd's 12 Rules - Object-Relational Mapping (ORM).

**UNIT-II** **STRUCTURED QUERY LANGUAGE (SQL)** **10**

SQL Basic Commands - Constraints - Database Objects - SQL Functions - Subqueries- Correlated Subqueries- Nested subqueries - Recursive queries - Common Table Expressions (CTEs) - Triggers and Stored procedures.

**UNIT-III** **DATABASE DESIGN AND NORMALIZATION** **9**

Database Design fundamentals - Entity-Relationship Diagrams (ERD) - ERD to tables - Functional Dependencies and Normal Forms: 1NF, 2 NF, 3 NF, BCNF, 4 NF, 5NF and 6 NF - Domain-Key Normal Form (DKNF) - Nested Normal Form (NNF) - Denormalization and Trade-offs - Emerging trends in Database Design - Dealing with real-world complexities in Database Design.

**UNIT-IV** **QUERY OPTIMIZATION AND TRANSACTION MANAGEMENT** **9**

Query Optimization and Execution Plans -Optimization Visualization Tool - DB Sharding - Vitess – Vitess vs MySQL- Table partitioning - Transaction Management and ACID Properties - Concurrency Control: Lock based protocols -Deadlock handling – Multi version concurrency control (MVCC) - Transaction isolation

**UNIT-V** **NOSQL AND NEWSQL DATABASES** **9**

NoSQL Vs NewSQL- NoSQLDatabases: MongoDB and Cassandra - NewSQL databases: Redis and NuoDB -Selection of NoSQL or NewSQL over RDBMS - CAP Theorem and BASE Properties - HeidiSQL - In-Memory Databases and Caching - Database Security and Encryption - Database Performance Tuning

**TOTAL: 45 PERIODS**

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**PRACTICAL EXPERIMENTS:**

1. Create a relational database with tables for storing employee details and perform CRUD operations.
2. Create a relational database for e-commerce applications and add primary key, foreign key, check constraints and triggers.
3. Create an ER diagram for the library management system and implement the database schema in RDBMS.
4. Create a Mongo DB database for an event management system.
5. Design a distributed database for an e-commerce platform to handle order processing.
6. Develop an in-memory caching solution using Redis for a content publishing platform (Blog).
7. Develop a secure RDBMS solution for a banking financial transactions system.

**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

CO1 : Analyze the data models and the types of data used in databases.

CO2 : Implement SQL queries for creating databases and performing the relational operations.

CO3 : Apply the normalization theory in relational databases for removing anomalies.

CO4 : Analyze the basic issues of transaction processing, concurrency control, deadlock and its recovery schemes.

CO5 : Analyze the performance of NoSQL and NewSQL databases related to design.

**TEXT BOOKS:**

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database System Concepts, McGraw - Hill, Sixth Edition, 2018
2. Ramez Elmasri and Shamkant B. Navathe, Fundamental Database Systems,Pearson Education, Seventh Edition, 2016

**REFERENCE BOOKS:**

1. Peter Rob and Corlos Coronel, Database System, Design, Implementation and Management, Thompson Learning Course Technology, Ninth edition, 2011
2. Guy Harrison , Next Generation Databases: NoSQLand Big Data, Apress.

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**E-RESOURCES:**

1. https://nptel.ac.in/courses/106106220
2. http://acl.digimat.in/nptel/courses/video/106105175/L01.html

**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 2 | 1 | - | - | 2 | 1 | 1 | 1 | 2 | 1 | 3 |
| CO2 | 3 | 1 | 1 | 1 | 1 | - | - | 2 | 3 | 3 | 3 | 3 | 1 | 2 |
| CO3 | 3 | 2 | 3 | 2 | 1 | - | - | 2 | 1 | 1 | 2 | 2 | 3 | 3 |
| CO4 | 1 | 2 | 3 | 2 | - | - | - | 3 | 2 | 3 | 3 | 1 | 2 | 3 |
| CO5 | 1 | 1 | 3 | 3 | 2 | - | - | 1 | 3 | 3 | 1 | 2 | 2 | 2 |
| AVG | 2 | 1.6 | 2.6 | 2 | 1.3 | - | - | 2 | 2 | 2.2 | 2 | 2 | 1.8 | 2.6 |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| 25ADT42 | ARTIFICIAL INTELLIGENCE ESSENTIALS | L | T | P | C |
|---|---|---|---|---|---|
| SDG.No. 4,8,9 | (for B.E/B.Tech – AIDS, AIML) | 3 | 0 | 0 | 3 |

**COURSE OBJECTIVES:**

- Learn the basic AI approaches
- Develop problem solving agents
- Perform logical and probabilistic reasoning
- Represent knowledge using first-order logic and perform forward chaining, backward chaining, and resolution-based inference.
- Analyze uncertain environments using Bayesian inference and Naïve Bayes models.

**UNIT-I** **INTELLIGENT AGENTS** **9**

Introduction to AI–Agents and Environments–concept to fractionality –nature of environments – structure of agents. Problem solving agents – search algorithms – uninformed search strategies.

**UNIT-II** **PROBLEM SOLVING** **9**

Heuristic search strategies – heuristic functions. Local search and optimization problems – local search in continuous space – search with non-deterministic actions – search in partially observable environments – online search agents and unknown environments.

**UNIT-III** **GAME PLAYING AND CSP** **9**

Game theory –optimal decisions in games –alpha-beta search –monte-Carlo tree search–stochastic games – partially observable games. Constraint satisfaction problems – constraint propagation–backtracking search for CSP–local search for CSP–structure of CSP.

**UNIT-IV** **KNOWLEDGE REPRESENTATION AND LOGICAL REASONING** **9**

Knowledge-based agents – propositional logic – agents based on propositional logic – first-order logic – syntax and semantics – knowledge representation and engineering – inferences in first-order logic – forward chaining – backward chaining – knowledge graphs and ontologies.

**UNIT-V** **PROBABILISTIC REASONING** **9**

Acting under uncertainty –Bayesian inference –naïve Bayes models. Probabilistic reasoning – Bayesian networks–exact inference in BN–approximate inference in BN–causal networks.

**TOTAL:45 PERIODS**

**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

**CO1:** Explain intelligent agent frameworks

**CO2:** Apply problem solving techniques

**CO3:** Apply game playing and CSP techniques

**CO4:** Perform logical reasoning

**CO5:** Perform probabilistic reasoning under uncertainty

**TEXT BOOKS:**

1. Stuart Russell and Peter Norvig, "Artificial Intelligence–A Modern Approach", Fourth Edition, Pearson Education, 2021.
2. Poole, D. L., & Mackworth, A. K., Artificial Intelligence: Foundations of Computational Agents, 3rd Edition, Cambridge University Press, 2023.

**REFERENCE BOOKS:**

1. Patrick H.Winston, "Artificial Intelligence", Third Edition, Pearson Education,2006
2. Deepak Khemani, "Artificial Intelligence", Tata McGraw Hill Education,2013.
3. Murphy, K. P., Probabilistic Machine Learning: An Introduction, MIT Press, 2022.
4. Mitchell, M., Artificial Intelligence: A Guide for Thinking Humans, 2024 Edition.

**E-RESOURCES:**

1. https://nptel.ac.in/courses/106102220
2. https://nptel.ac.in/courses/106105077

**CO's–PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 1 | 3 | 3 | - | - | - | 2 | 3 | 3 | 1 | 2 | 1 | 1 |
| CO2 | 2 | 2 | 1 | 1 | 1 | - | - | 2 | 2 | 3 | 1 | 3 | 2 | 2 |
| CO3 | 2 | 1 | 2 | 1 | - | - | - | 2 | 1 | 1 | 3 | 1 | 2 | 1 |
| CO4 | 2 | 1 | 2 | 2 | - | - | - | 2 | 1 | 2 | 2 | 1 | 3 | 3 |
| CO5 | 3 | 2 | 2 | 1 | 1 | - | - | 3 | 2 | 1 | 2 | 2 | 2 | 1 |
| **AVG** | **2** | **1** | **2** | **2** | **1** | **-** | **-** | **2** | **2** | **2** | **2** | **2** | **2** | **2** |

**1- low,2- medium,3- high,'-'- no correlation**

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| 25ADL41<br>SDG No. 4,9,11 | ARTIFICIAL INTELLIGENCE LABORATORY<br>(for B.Tech. –AIDS) | L<br>0 | T<br>0 | P<br>3 | C<br>2 |
|---|---|---|---|---|---|

**COURSE OBJECTIVES:**

- To design and implement search strategies
- To implement game playing techniques
- To implement CSP techniques
- To develop systems with logical reasoning
- To develop systems with probabilistic reasoning

**PRACTICAL EXERCISES**

**LIST OF EXPERIMENTS**

1. Implement basic search strategies – 8-Puzzle, 8 - Queens problem, Cryptarithmetic.
2. Implement A* and memory bounded A* algorithms
3. Implement Mini max algorithm for game playing (Alpha-Beta pruning)
4. Solve constraint satisfaction problems
5. Implement propositional model checking algorithms
6. Implement forward chaining, backward chaining, and resolution strategies
7. Build naïve Bayes models
8. Implement Bayesian networks and perform inferences
9. Mini-Project

**TOTAL : 60 PERIODS**

**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

**CO1:** Design and implement search strategies

**CO2:** Implement game playing and CSP techniques

**CO3 :** Develop logical reasoning systems

**CO4 :** Develop probabilistic reasoning systems

**CO5 :** Process compound data using Python data structures and Utilize Python packages in developing software applications.

**E-RESOURCES:**

https://nptel.ac.in/courses/106102220

https://nptel.ac.in/courses/106105077

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**CO's – PO's & PSO's MAPPING**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 1 | 3 | 3 | - | - | - | 1 | 1 | 2 | 1 | 3 | 2 | 1 |
| CO2 | 1 | 2 | 3 | 3 | 2 | - | - | 3 | 2 | 3 | 3 | 3 | 3 | 2 |
| CO3 | 3 | 1 | 3 | 3 | 1 | - | - | 1 | 3 | 1 | 2 | 1 | 1 | 3 |
| CO4 | 2 | 1 | 1 | 1 | 1 | - | - | 2 | 3 | 1 | 2 | 2 | 2 | 1 |
| CO5 | 3 | 1 | 1 | 1 | 1 | - | - | 1 | 3 | 3 | 3 | 3 | 3 | 2 |
| AVG | 2 | 1 | 2 | 2 | 1 | - | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**1 - low, 2 - medium, 3 - high, '-' - no correlation**

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| 25SDC41 | SOFT AND ANALYTICAL SKILLS – I | L | T | P | C |
|---|---|---|---|---|---|
| SDG No.4,8,10 | (Common to B.E./B.Tech. All Branches) | 1 | 0 | 0 | 1 |

**COURSE OBJECTIVES:**

- Develop effective communication, presentation, and public speaking skills for academic and professional contexts.
- Enhance interpersonal, teamwork, collaboration, and professional etiquette skills required in the workplace.
- Strengthen students' aptitude and arithmetic problem-solving abilities through quantitative techniques.
- Improve logical reasoning and analytical thinking skills for competitive examinations and placement assessments.
- Equip students with the confidence and employability skills necessary for career development and lifelong learning.

**UNIT-I** **COMMUNICATION AND PRESENTATION SKILLS** 3

Communication Fundamentals (Verbal and Non-verbal Communication, Barriers to Effective Communication, Active Listening Skills); Public Speaking Skills and Overcoming Stage Fear (Glossophobia) ; Presentation Techniques (Seminar and TED Talk Presentations)

**UNIT-II** **COLLABORATIVE SKILLS FOR PROFESSIONAL SUCCESS** 3

Interpersonal Communication and Professional Etiquette; Teamwork, Team Dynamics, and Stages of Team Development (Tuckman's Model); Collaboration and Problem Solving in Group Discussions

**UNIT-III** **CRACKING APTITUDE** 3

Divisibility Rules –LCM & GCD(HCF) – Average

**UNIT-IV** **CORE ARITHMETIC** 3

Ratio & Proportion – Time & Work – Mixture & Alligation

**UNIT-V** **REASONING** 3

Coding- Decoding – Blood Relation- Direction Sense

**TOTAL : 15 PERIODS**

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**COURSE OUTCOMES:**

**At the end of the course the students will be able to**

CO1 : Demonstrate effective communication, public speaking, and presentation skills in academic and professional environments.

CO2 : Apply interpersonal, teamwork, collaboration, and professional etiquette skills to work effectively in groups.

CO3 : Solve aptitude problems involving divisibility rules, LCM, HCF, and averages using appropriate quantitative techniques.

CO4 : Apply arithmetic concepts such as ratio and proportion, time and work, and mixture and alligation to solve quantitative problems.

CO5 : Analyze and solve logical reasoning problems involving coding-decoding, blood relations, and direction sense.

**TEXT BOOKS:**

1. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, 4th Edition, Oxford University Press, 2024.
2. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, Revised Edition 2025, S. Chand Publishing.

**REFERENCE BOOKS:**

1. Barun K. Mitra, Personality Development and Soft Skills, 2nd Edition, Oxford University Press, 2023.
2. Arun Sharma, A Modern Approach to Verbal and Non-Verbal Reasoning, Revised Edition, McGraw Hill Education, 2024.

**E. RESOURCES:**

- https://www.indiabix.com/aptitude/questions-and-answers
- https://www.mindtools.com/pages/article/newLDR_86.htm
- https://www.tutorialspoint.com/quantitative_aptitude/index.htm

**CO's-PO's MAPPING:**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | - | - | - | - | - | 2 | 3 | - | 1 | - | - |
| CO2 | - | - | - | - | - | - | - | 1 | 3 | 2 | - | 1 | - | - |
| CO3 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - | 1 |
| CO4 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 1 |
| CO5 | 2 | 3 | - | 1 | - | - | - | - | - | - | - | - | - | 1 |
| AVR | 2.67 | 2.67 | - | 1.00 | - | - | - | 1.00 | 2.50 | 2.50 | - | 1.00 | - | 1.00 |

**1- Low, 2- Medium, 3-High, "-" No Correlation**

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