



**SCHOOL OF ENGINEERING AND TECHNOLOGY  
SCHOOL OF ENGINEERING AND TECHNOLOGY  
Bachelor of Science (Information Technology)**

**Programme Code: SET0126**

**Duration- 1/2/3/4 Years Full Time**

**PROGRAM STRUCTURE  
AND  
CURRICULUM & SCHEME OF EXAMINATION  
2021**

## **1. Standard Structure of the Program at University Level**

---

### **1.1 Vision, Mission and Core Values of the University**

---

#### **Vision of the University**

**To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.**

#### **Mission of the University**

- 1. Transformative educational experience**
- 2. Enrichment by educational initiatives that encourage global outlook**
- 3. Develop research, support disruptive innovations and accelerate entrepreneurship**
- 4. Seeking beyond boundaries**

#### **Core Values**

- Integrity**
- Leadership**
- Diversity**
- Community**

**Note: Detailed Mission Statements of University can be used for developing Mission Statements of Schools/ Departments.**

## Vision and Mission of the School

---

### **Vision of the School**

**To become a globally acclaimed institution of higher learning in engineering and technology promoting excellence in research, innovation and entrepreneurship**

### **Mission of the School**

- 1. To impart quality education with strong industry & academic connectivity in the expanding fields of Engineering and Technology in a conducive and enriching learning environment.**
- 2. To product technocrats equipped with technical & soft skills and experiential learning required to stay current with the modern tools in emerging technologies to fulfill professional responsibilities and uphold ethical values.**
- 3. To inculcate a culture of interdisciplinary research, innovation and entrepreneurship to provide sustainable solutions to meet the growing challenges and societal needs.**
- 4. To foster collaborative learning and to play adaptive leadership role in professional career and pursuit of higher education through effective mentoring and counseling.**

### **Core Values**

- Industry & Academic Connectivity**
- Experiential learning**
- Interdisciplinary research**
- Global**

## 1.2 Vision and Mission of the Department

---

### **Vision of the Department**

**To be recognized as the fountainhead of excellence in technical knowledge and research in computer science and engineering to attract students and scholars across the globe**

### **Mission of the Department**

- 1. To strengthen core competency of students to be successful, ethical, effective problem solver in Computer Science & Engineering through analytical learning.**
- 2. To promote interdisciplinary research & innovation-based activities in emerging areas of technology globally**
- 3. To facilitate and foster the industry-academia collaboration to enhance entrepreneurship skills and acquaintance with corporate culture.**
- 4. To inculcate in them a higher degree of social consciousness and moral values towards solving interdisciplinary societal problems using industry-academia collaboration**

### **Core Values**

- Competency**
- Global**
- Entrepreneurship Skills**
- Interdisciplinary research**

### 1.3 Programme Educational Objectives (PEO)

---

#### 1.3.1 Writing Programme Educational Objectives (PEO)

---

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

The Program Educational Objectives (PEOs) of UG Program in Computer Science & Engineering are:

**PEO-1** The graduates will establish themselves as professionals by solving real-life problems using exploratory and analytical skills acquired in the field of Computer Science and Engineering.

**PEO-2** The graduates will provide sustainable solutions to ever changing interdisciplinary global problems through their Research & Innovation capabilities.

**PEO-3** The graduates will become employable, successful entrepreneur as an outcome of Industry-Academia collaboration.

**PEO-4** The graduates will embrace professional code of ethics while providing solution to multidisciplinary social problems in industrial, entrepreneurial and research environment to demonstrate leadership qualities

#### Methods of Forming PEO's

- STEP 1 : The needs of the Nation and society are identified through scientific publications, industry interaction and media.
- STEP 2. Taking the above into consideration, the PEOs are established by the Coordination Committee of the department.
- STEP 3. The PEOs are communicated to the alumni and their suggestions are obtained.
- STEP 4. The PEOs are communicated to all the faculty members of the department and their feedback is obtained.
- STEP 5. The PEOs are then put to the Board of Studies of the department for final approval.

*[Note: Prepare a file for the same, how you arrive for PEO's]*

### 1.3.2 Map PEOs with Mission Statements:

| DEPARTMENT<br>PEOs<br><br>DEPT OF<br>CSE<br>MISSION<br>STATEMENTS  | 1. The graduates will establish themselves as professionals by solving real-life problems using exploratory and analytical skills acquired in the field of Computer Science and Engineering. | 2. The graduates will be able to provide sustainable solutions to ever changing interdisciplinary global problems through their Research & Innovation capabilities. | 3. The graduates will become employable, successful entrepreneur and innovator as an outcome of Industry-Academia collaboration. | 4. The graduates will be able to embrace professional code of ethics while providing solution to multidisciplinary social problems in industrial, entrepreneurial and research environment to demonstrate leadership qualities. |       |
|--|--|---|--|---|-------|
| 1. To strengthen core competency of students to be successful, ethical, effective problem solver in Computer Science & Engineering through analytical learning.            | 3  | 3   | 2  | 2   | 10/12 |
| 2. To promote interdisciplinary research & innovation based activities in emerging areas of technology globally.   | 2  | 3   | 2  | 2   | 9/12  |
| 3. To facilitate and foster the industry-academia collaboration to enhance entrepreneurship skills and acquaintance with corporate culture.                                | 2  | 2   | 3  | 3   | 10/12 |
| 4: To inculcate in them a higher degree of social consciousness and moral values towards solving interdisciplinary societal problems using industry-academia collaboration | 2  | 2   | 2  | 3   | 9/12  |
|  | 9/12   | 10/12   | 9/12   | 10/12   | 83%   |

Enter correlation levels 1, 2, or 3 as defined below:

- 1. Slight (Low)    2. Moderate (Medium)    3. Substantial (High)**

If there is no correlation, put “-“

### 1.3.3 Program Outcomes (PO's)

|               |  |  |
|---------------|--|--|
| <b>PO1:</b>   | <b>Computing knowledge:</b>                      | Understand the basic principles and methods of computer science for solving complex computing problems.  |
| <b>PO2:</b>   | <b>Problem Analysis and Design of solutions:</b> | Analyze and formulate a problem, evaluate a computing-based solution to meet a given set of requirements using software development concepts.  |
| <b>PO3:</b>   | <b>Modern tool usage:</b>                        | Ability to select and apply current techniques and modern IT Tools for innovative software solutions.  |
| <b>PO4:</b>   | <b>Technical Skill Development</b>               | To develop and sharpen programming, networking, and other computer science skills required in the field of study/ higher education.  |
| <b>PO5:</b>   | <b>Societal Concern:</b>                         | Utilize the role of computing for solving real life problems and to analyze its global impact on individuals, organizations, and society.  |
| <b>PO6:</b>   | <b>Environment and Sustainability :</b>          | Actively involved with knowledge, skills and right attitude in environmental context for sustainable development.  |
| <b>PO7:</b>   | <b>Ethics:</b>                                   | Recognize ethical principles and moral values for the computing profession in global economic environment.   |
| <b>PO8:</b>   | <b>Individual and team work:</b>                 | Ability to function effectively as an individual or a team member engaged in accomplishes a common goal.   |
| <b>PO9:</b>   | <b>Communication:</b>                            | Development of good communication skills in both written and verbal form to convey technical information effectively and accurately.   |
| <b>PO10 :</b> | <b>Life-long learning:</b>                       | Ability to recognize the need of training and skills to engage in self-regulating and life-long learning.  |
| <b>PSO1 :</b> | <b>Computer Science</b>                          | Provide effective and efficient solutions to real life problems using acquired knowledge in Data Mining, graph theory, advanced DBMS and other computer science concepts for continued professional development. |
| <b>PSO2 :</b> | <b>Information Technology</b>                    | Explore and provide software solutions of complex problems using information technology concepts like Enterprise Resource Planning, network security, IT infrastructure management.                              |

### 1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

| Mapping      | PEO1 | PEO2 | PEO3 | PEO4 |
|--------------|------|------|------|------|
| <b>PO1:</b>  | 3    | 3    | 2    | 1    |
| <b>PO2:</b>  | 3    | 3    | 3    | 1    |
| <b>PO3:</b>  | 2    | 2    | 3    | 2    |
| <b>PO4:</b>  | 2    | 3    | 2    | 2    |
| <b>PO5:</b>  | 1    | 2    | 2    | 3    |
| <b>PO6:</b>  | 1    | 1    | 2    | 3    |
| <b>PO7:</b>  | 1    | 1    | 2    | 3    |
| <b>PO8:</b>  | 1    | 2    | 3    | 1    |
| <b>PO9:</b>  | 1    | 1    | 3    | 2    |
| <b>PO10:</b> | 2    | 3    | 1    | 1    |
| <b>PSO1:</b> | 2    | 3    | 1    | 3    |
| <b>PSO2:</b> | 3    | 3    | 2    | 2    |

*1. Slight (Low)*

*2. Moderate (Medium)*

*3. Substantial (High)*



### 1.3.5 Program Outcome Vs Courses Mapping Table<sup>1</sup>:

---

*1. Slight (Low)*

*2. Moderate (Medium)*

*3. Substantial (High)*

---

<sup>1</sup> Cel value will contain the correlation value of respective course with PO.

### 1.3.5.2 COURSE ARTICULATION MATRIX<sup>2</sup>

---

**1-Slight (Low)**

**2-Moderate (Medium)**

**3-Substantial (High)**

---

<sup>2</sup> Each course outcome (Based on Blooms Taxonomy-CO1, CO2, CO3, CO4, CO5, and CO6) of the course needs to map with PO. This table evolves once faculty has mapped each course outcomes of their respective course with PO's.

## Course Outcome

- **Course Outcomes**–What is it?
  - Course outcomes (COs) are clear statements of what a student should be able to demonstrate on completion of a course.
  - COs should be assessable and measurable knowledge, skills, abilities and attitudes that student attains by the end of the course.
  - It is generally good idea to identify between 4 and 7 outcomes.
  - All courses in a particular programme shall have their own PO.
  - Each CO is mapped to relevant PO.
  - The teaching learning process and assessment process are to be designed in a way to achieve the COs.

## Beginning words for Course Outcome:

Active verbs developed based on Bloom's Taxonomy

| Knowledge | Understand    | Apply       | Analyze       | Evaluate     | Create      |
|-----------|---------------|-------------|---------------|--------------|-------------|
| define    | explain       | solve       | analyze       | reframe      | design      |
| identify  | describe      | apply       | compare       | criticize    | compose     |
| describe  | interpret     | illustrate  | classify      | evaluate     | create      |
| label     | paraphrase    | modify      | contrast      | order        | plan        |
| list      | summarize     | use         | distinguish   | appraise     | combine     |
| name      | classify      | calculate   | infer         | judge        | formulate   |
| state     | compare       | change      | separate      | support      | invent      |
| match     | differentiate | choose      | explain       | compare      | hypothesize |
| recognize | discuss       | demonstrate | select        | decide       | substitute  |
| select    | distinguish   | discover    | categorize    | discriminate | write       |
| examine   | extend        | experiment  | connect       | recommend    | compile     |
| locate    | predict       | relate      | differentiate | summarize    | construct   |
| memorize  | associate     | show        | discriminate  | assess       | develop     |
| quote     | contrast      | sketch      | divide        | choose       | generalize  |
| recall    | convert       | complete    | order         | convince     | integrate   |
| reproduce | demonstrate   | construct   | point out     | defend       | modify      |
| tabulate  | estimate      | dramatize   | prioritize    | estimate     | organize    |
| tell      | express       | interpret   | subdivide     | find errors  | prepare     |
| copy      | Identify      | Manipulate  | survey        | grade        | produce     |
| discover  | indicate      | Paint       | advertise     | measure      | rearrange   |
| duplicate | Infer         | Prepare     | appraise      | predict      | rewrite     |
| enumerate | relate        | produce     | Break down    | rank         | role-play   |

(Reference: Retrieved from <http://www.teachthought.com/learning/249-blooms-taxonomy-verbs-for-critical-thinking/>)

| School of Engineering and Technology         |             |   |               |   |   |           |                            |
|--|-------------|---|---------------|---|---|-----------|----------------------------|
| Department Of Computer Science & Engineering |             |   |               |   |   |           |                            |
| B.Sc in Computer Science                     |             |   |               |   |   |           |                            |
| Batch: 2021 Onwards                          |             |   |               |   |   | TERM: I   |                            |
| S. No.                                       | Course Code | Course  | Teaching Load |   |   | Credits   | Pre-Requisite/Co Requisite |
|  |             |   | L             | T | P |           |                            |
| <b>THEORY SUBJECTS</b>                       |             |   |               |   |   |           |                            |
| 1  |             | Problem solving using C Programming             | 4             | 0 | 0 | 4         |                            |
| 2  |             | Discrete Structures and Data Structure          | 4             | 0 | 0 | 4         |                            |
| 3  |             | Digital Electronics & Computer Organization     | 4             | 0 | 0 | 4         |                            |
| 4  |             | Vocational Faculty-1                            | 3             | 0 | 0 | 3         |                            |
| 5  |             | Food and Nutrition                              | 2             | 0 | 0 | 2         |                            |
| <b>Practical/Viva-Voce/Jury</b>              |             |   |               |   |   |           |                            |
| 6  | ARP101      | Communicative English-1                         | 1             | 0 | 2 | 2         |                            |
| 7  |             | Problem solving using C Programming Lab         | 0             | 0 | 4 | 2         |                            |
| 8  |             | Discrete Structures and Data Structure Lab      | 0             | 0 | 4 | 2         |                            |
| 9  |             | Digital Electronics & Computer Organization Lab | 0             | 0 | 4 | 2         |                            |
| <b>TOTAL CREDITS</b>                         |             |   |               |   |   | <b>25</b> |                            |

| School of Engineering and Technology         |             |  |               |          |   |           |                            |
|--|-------------|--|---------------|----------|---|-----------|----------------------------|
| Department Of Computer Science & Engineering |             |  |               |          |   |           |                            |
| B.Sc in Computer Science                     |             |  |               |          |   |           |                            |
| Batch: 2021 Onwards                          |             |  |               | TERM: II |   |           |                            |
| S. No.                                       | Course Code | Course   | Teaching Load |          |   | Credits   | Pre-Requisite/Co Requisite |
|  |             |  | L             | T        | P |           |                            |
| <b>THEORY SUBJECTS</b>                       |             |  |               |          |   |           |                            |
| 1  |             | Data Base Management System                                  | 4             | 0        | 0 | 4         |                            |
| 2  |             | Principles of Operating System                               | 4             | 0        | 0 | 4         |                            |
| 3  |             | Object Oriented Programming and Web Designing Using Java     | 4             | 0        | 0 | 4         |                            |
| 4  |             | Vocational Faculty-2   | 3             | 0        | 0 | 3         |                            |
| 5  |             | Health and Hygien  | 2             | 0        | 0 | 2         |                            |
| <b>Practical/Viva-Voce/Jury</b>              |             |  |               |          |   |           |                            |
| 6  | ARP102      | Communicative English -2                                     | 1             | 0        | 2 | 2         |                            |
| 7  |             | Data Base Management System Lab                              | 0             | 0        | 4 | 2         |                            |
| 8  |             | Operating System and Unix Shell Programing Lab               | 0             | 0        | 4 | 2         |                            |
| 9  |             | Object Oriented Programming and Web Designing Using Java Lab | 0             | 0        | 4 | 2         |                            |
| <b>TOTAL CREDITS</b>                         |             |  |               |          |   | <b>25</b> |                            |

| School of Engineering and Technology         |             |   |               |   |   |           |                             |
|--|-------------|---|---------------|---|---|-----------|-----------------------------|
| Department Of Computer Science & Engineering |             |   |               |   |   |           |                             |
| B.Sc in Computer Science                     |             |   |               |   |   |           |                             |
| Batch: 2021 Onwards                          |             |   |               |   |   | TERM: III |                             |
| S. No.                                       | Course Code | Course  | Teaching Load |   |   | Credits   | Pre-Requisite/Co Requisite  |
|  |             |   | L             | T | P |           |                             |
| <b>THEORY SUBJECTS</b>                       |             |   |               |   |   |           |                             |
| 1  |             | Application based Programming in Python and Machine Learning        | 4             | 0 | 0 | 4         |                             |
| 2  |             | Computer Networks and Data Communication                            | 4             | 0 | 0 | 4         |                             |
| 3  |             | Theory of Computations and Mathematics in Computer Applications     | 4             | 0 | 0 | 4         |                             |
| 4  |             | Vocational Faculty-3  | 3             | 0 | 0 | 3         |                             |
| 5  |             | Physical Education  | 2             | 0 | 0 | 2         |                             |
| <b>Practical/Viva-Voce/Jury</b>              |             |   |               |   |   |           |                             |
| 6  | ARP207      | Logical Skills Building and Soft Skills                             | 1             | 0 | 2 | 2         |                             |
| 7  |             | Application based Programming in Python and Machine Learning Lab    | 0             | 0 | 4 | 2         |                             |
| 8  |             | Computer Networks and Data Communication Lab                        | 0             | 0 | 4 | 2         |                             |
| 9  |             | Theory of Computations and Mathematics in Computer Applications Lab | 0             | 0 | 2 | 1         | NT lab                      |
|  |             | Project Based Learning-1  | 0             | 0 | 2 | 1         | Office automation tools lab |
| <b>TOTAL CREDITS</b>                         |             |   |               |   |   | <b>25</b> |                             |

| School of Engineering and Technology         |             |  |               |   |          |           |                            |
|--|-------------|--|---------------|---|----------|-----------|----------------------------|
| Department Of Computer Science & Engineering |             |  |               |   |          |           |                            |
| B.Sc in Computer Science                     |             |  |               |   |          |           |                            |
| Batch: 2021 Onwards                          |             |  |               |   | TERM: IV |           |                            |
| S. No.                                       | Course Code | Course   | Teaching Load |   |          | Credits   | Pre-Requisite/Co Requisite |
|  |             |  | L             | T | P        |           |                            |
| <b>THEORY SUBJECTS</b>                       |             |  |               |   |          |           |                            |
| 1  |             | Artificial Intelligence and Expert Systems           | 4             | 0 | 0        | 4         |                            |
| 2  |             | Design and Analysis of Algorithm                     | 4             | 0 | 0        | 4         |                            |
| 3  |             | Research Methodology                                 | 4             | 0 | 0        | 4         |                            |
| 4  |             | Vocational Faculty-4                                 | 3             | 0 | 0        | 3         |                            |
| 5  |             | Human values and Environment Studies                 | 2             | 0 | 0        | 2         |                            |
| <b>Practical/Viva-Voce/Jury</b>              |             |  |               |   |          |           |                            |
| 6  | ARP208      | Quantitative and Qualitative Aptitude Skill Building | 1             | 0 | 2        | 2         |                            |
| 7  |             | Artificial Intelligence and Expert Systems Lab       | 0             | 0 | 4        | 2         |                            |
| 8  |             | Design and Analysis of Algorithm Lab                 | 0             | 0 | 4        | 2         |                            |
|  |             | Project Based Learning-2                             | 0             | 0 | 4        | 2         |                            |
| <b>TOTAL CREDITS</b>                         |             |  |               |   |          | <b>25</b> |                            |

| School of Engineering and Technology         |             |  |               |   |   |           |                            |
|--|-------------|--|---------------|---|---|-----------|----------------------------|
| Department Of Computer Science & Engineering |             |  |               |   |   |           |                            |
| B.Sc in Computer Science                     |             |  |               |   |   |           |                            |
| Batch: 2021 Onwards                          |             |  |               |   |   | TERM: V   |                            |
| S. No.                                       | Course Code | Course                                   | Teaching Load |   |   | Credits   | Pre-Requisite/Co Requisite |
|  |             |  | L             | T | P |           |                            |
| <b>THEORY SUBJECTS</b>                       |             |  |               |   |   |           |                            |
| 1  |             | Software Engineering                     | 4             | 0 | 0 | 4         |                            |
| 2  |             | SoftComputing                            | 4             | 0 | 0 | 4         |                            |
| 3  |             | Program Elective-1                       | 4             | 0 | 0 | 4         |                            |
| 4  |             | Program Elective-2                       | 4             | 0 | 0 | 4         |                            |
| <b>Practical/Viva-Voce/Jury</b>              |             |  |               |   |   |           |                            |
| 6  |             | Analytical Ability and Digital Awareness | 1             | 0 | 2 | 2         |                            |
| 7  |             | Research Project-1                       |               |   |   | 4         |                            |
|  |             | Industrial Training                      |               |   |   | 3         |                            |
| <b>TOTAL CREDITS</b>                         |             |  |               |   |   | <b>25</b> |                            |



| School of Engineering and Technology         |             |  |               |   |          |           |                            |
|--|-------------|--|---------------|---|----------|-----------|----------------------------|
| Department Of Computer Science & Engineering |             |  |               |   |          |           |                            |
| B.Sc in Computer Science                     |             |  |               |   |          |           |                            |
| Batch: 2021 Onwards                          |             |  |               |   | TERM: VI |           |                            |
| S. No.                                       | Course Code | Course   | Teaching Load |   |          | Credits   | Pre-Requisite/Co Requisite |
|  |             |  | L             | T | P        |           |                            |
| <b>THEORY SUBJECTS</b>                       |             |  |               |   |          |           |                            |
| 1  |             | Software Testing and Quality Assurance           | 4             | 0 | 0        | 4         |                            |
| 2  |             | Program Elective-3                               | 4             | 0 | 0        | 4         |                            |
| 3  |             | Program Elective-4                               | 4             | 0 | 0        | 4         |                            |
| <b>Practical/Viva-Voce/Jury</b>              |             |  |               |   |          |           |                            |
| 6  |             | Communication Skills and Personality Development | 1             | 0 | 2        | 2         |                            |
| 7  |             | Research Project-2                               |               |   |          | 6         |                            |
| 8  |             | Simulation Lab Pract-1                           | 0             | 0 | 2        | 1         |                            |
| 9  |             | Technical Skill Enhancement Course-1             | 0             | 0 | 2        | 1         |                            |
|  |             | Community connect program                        |               |   |          | 3         |                            |
| <b>TOTAL CREDITS</b>                         |             |  |               |   |          | <b>25</b> |                            |

| School of Engineering and Technology         |             |                                      |               |   |   |           |                            |
|--|-------------|--------------------------------------|---------------|---|---|-----------|----------------------------|
| Department Of Computer Science & Engineering |             |                                      |               |   |   |           |                            |
| B.Sc in Computer Science                     |             |                                      |               |   |   |           |                            |
| Batch: 2021 Onwards                          |             |                                      |               |   |   | TERM: VII |                            |
| S. No.                                       | Course Code | Course                               | Teaching Load |   |   | Credits   | Pre-Requisite/Co Requisite |
|  |             |                                      | L             | T | P |           |                            |
| <b>THEORY SUBJECTS</b>                       |             |                                      |               |   |   |           |                            |
| 1  |             | Computer Graphics and Animations     | 4             | 0 | 0 | 4         |                            |
| 2  |             | Program Elective-5                   | 4             | 0 | 0 | 4         |                            |
| 3  |             | Program Elective-6                   | 4             | 0 | 0 | 4         |                            |
| 4  |             | Program Elective-7                   | 4             | 0 | 0 | 4         |                            |
| 5  |             | Introduction of Entrepreneurship     | 2             | 0 | 0 | 2         |                            |
| <b>Practical/Viva-Voce/Jury</b>              |             |                                      |               |   |   |           |                            |
| 6  |             | Computer Graphics and Animations Lab | 0             | 0 | 4 | 2         |                            |
| 7  |             | Seminar-1                            | 1             | 0 | 2 | 2         |                            |
| 8  |             | Industrial Training                  |               |   |   | 3         |                            |
| 9  |             | Capstone - 1                         | -             | - | - | 3         |                            |
| <b>TOTAL CREDITS</b>                         |             |                                      |               |   |   | <b>28</b> |                            |

| School of Engineering and Technology         |             |                                  |               |   |            |           |                            |
|--|-------------|----------------------------------|---------------|---|------------|-----------|----------------------------|
| Department Of Computer Science & Engineering |             |                                  |               |   |            |           |                            |
| B.Sc in Computer Science                     |             |                                  |               |   |            |           |                            |
| Batch: 2021 Onwards                          |             |                                  |               |   | TERM: VIII |           |                            |
| S. No.                                       | Course Code | Course                           | Teaching Load |   |            | Credits   | Pre-Requisite/Co Requisite |
|  |             |                                  | L             | T | P          |           |                            |
| <b>THEORY SUBJECTS</b>                       |             |                                  |               |   |            |           |                            |
| 1  |             | Pattern Recognition              | 4             | 0 | 0          | 4         |                            |
| 2  |             | Program Elective-8               | 4             | 0 | 0          | 4         |                            |
| 3  |             | Program Elective-9               | 4             | 0 | 0          | 4         |                            |
| 4  |             | Program Elective-10              | 4             | 0 | 0          | 4         |                            |
| 5  |             | Introduction of Entrepreneurship | 2             | 0 | 0          | 2         |                            |
| <b>Practical/Viva-Voce/Jury</b>              |             |                                  |               |   |            |           |                            |
| 6  |             | Pattern Recognition Lab          | 0             | 0 | 4          | 2         |                            |
| 7  |             | Seminar-2                        | 1             | 0 | 2          | 2         |                            |
| 8  |             | Capstone - 2                     |               |   |            | 6         |                            |
| <b>TOTAL CREDITS</b>                         |             |                                  |               |   |            | <b>28</b> |                            |

## *C. Course Syllabuses*

## Syllabus: Database Management System Lab

|                       |                        |  |            |
|-----------------------|------------------------|--|------------|
| <b>School: SET</b>    |                        | <b>Batch: 2021-2024</b>  |            |
| <b>Program: B. Sc</b> |                        | <b>Current Academic Year: 2021-2022</b>  |            |
| <b>Branch: CSE/IT</b> |                        | <b>Semester: II</b>  |            |
| 1                     | Course Code            |  |            |
| 2                     | Course Title           | Database Management System Lab   |            |
| 3                     | Credits                | 2  |            |
| 4                     | Contact Hours (L-T-P)  | 0-0-4  |            |
|                       | Course Status          | Compulsory   |            |
| 5                     | Course Objective       | <ul style="list-style-type: none"> <li>To Develop efficient SQL programs to access Oracle databases</li> <li>Build database using Data Definition Language Statements</li> <li>Perform operations using Data Manipulation Language statements like Insert, Update and Delete</li> </ul>  |            |
| 6                     | Course Outcomes        | <p>By the end of this course, the student will be able to:</p> <p>CO1: Understand the basic concept of SQL commands in DBMS.<br/>         CO2: Demonstrate various DDL Commands used to create and alter a table.<br/>         CO3: Experiment with operations using Data Manipulation Language statements like Insert, Update and Delete.<br/>         CO4: Examine data to apply various grouping clauses and aggregate functions.<br/>         CO5: Evaluate the queries using the concepts like sub-queries, JOINS, Views, Cursors, Triggers.<br/>         CO6: Develop project based on various SQL commands.</p> |            |
| 7                     | Course Description     | An introduction to the design and creation of relational databases. Create database-level applications and tuning robust business applications. Lab sessions reinforce the learning objectives and provide participants the opportunity to gain practical hands-on experience.   |            |
| 8                     | Outline syllabus       |  | CO Mapping |
|                       | <b>Unit 1</b>          | <b>Practical based Data types</b>  |            |
|                       |                        | Classification SQL, Data types of SQL/Oracle   | CO1, CO6   |
|                       | <b>Unit 2</b>          | <b>Practical based on DDL commands</b>   |            |
|                       |                        | Create table, Alter table and Drop table   | CO2, CO6   |
|                       | <b>Unit 3</b>          | <b>DML commands</b>  |            |
|                       |                        | Introduction about the INSERT, SELECT, UPDATE & DELETE commands.   | CO3, CO6   |
|                       | <b>Unit 4</b>          | <b>Practical based on Grouping Clauses GROUP BY, ORDER BY, HAVING &amp; Aggregate Functions</b>  |            |
|                       |                        | Briefly explain Group by, order by, having clauses with examples.<br>Aggregate function: sum, avg, count, max, min   | CO4, CO6   |
|                       | <b>Unit 5</b>          | <b>Practical based on Sub- queries, JOINS, Views</b>   |            |
|                       |                        | Related example of Sub- queries, Joins and related examples, Views, Cursors, Trigger, PL/SQL   | CO5, CO6   |
|                       | Mode of examination    | Jury/Practical/Viva  |            |
|                       | Weightage Distribution | CA<br>60%  | MTE<br>0%  |
|                       |                        | ETE<br>40%   |            |
|                       | Text book/s*           | 1. Korth, Silberschatz & Sudarshan, Data base Concepts, Tata McGraw-Hill   |            |
|                       | Other References       | 1. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education Inc.<br>2. Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education, Latest Edition.   |            |

### CO and PO Mapping

| S. No. | Course Outcome  | Program Outcomes (PO) & Program Specific Outcomes (PSO) |
|--------|---|---|
| 1.     | CO1: Understand the basic concept of SQL commands in DBMS.  | PO1,PO3,PO4,PO8,PO9,PO10,PSO1                           |
| 2.     | CO2: Demonstrate various DDL Commands used to create and alter a table.                                     | PO1,PO2,PO3,PO4,PO8,PO9,PO10                            |
| 3.     | CO3: Experiment with operations using Data Manipulation Language statements like Insert, Update and Delete. | PO1,PO2,PO3,PO4,PO8,PO9,PO10                            |
| 4.     | CO4: Examine data to apply various grouping clauses and aggregate functions.                                | PO1,PO2,PO3,PO4,PO8,PO9,PO10,PSO1                       |
| 5.     | CO5: Evaluate the queries using the concepts like sub-queries, JOINS, Views, Cursors, Triggers.             | PO1,PO2,PO3,PO4,PO8,PO9,PO10, PSO1                      |
| 6.     | CO6: Develop project based on various SQL commands.   | PO1,PO2,PO3,PO4,PO5, PO7, PO8, PO9, PO10, PSO1          |

### **PO and PSO mapping with level of strength for Course Name Database Management System lab (Course Code)**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3   | -   | 3   | 2   | -   | -   | -   | 2   | 2   | 2    | 1    | -    |
| CO2 | 3   | 3   | 3   | 2   | -   | -   | -   | 3   | 2   | 2    | -    | -    |
| CO3 | 3   | 3   | 3   | 2   | -   | -   | -   | 3   | 2   | 2    | -    | -    |
| CO4 | 3   | 3   | 3   | 3   | -   | -   | -   | 3   | 2   | 2    | 2    | -    |
| CO5 | 3   | 3   | 3   | 2   | -   | -   | -   | 3   | 2   | 2    | 2    | -    |
| CO6 | 3   | 3   | 3   | 2   | 2   | -   | 2   | 3   | 2   | 2    | 3    | -    |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code/ Name | PO 1 | PO2 | PO 3 | PO 4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PSO 1 | PSO 2 |
|-------------------|------|-----|------|------|-----|-----|-----|-----|-----|------|-------|-------|
| DBMS lab          | 3    | 3   | 3    | 2.2  | 2   | -   | 2   | 2.8 | 2   | 2    | 2     | -     |

### **Strength of Correlation**

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

### Syllabus: Database Management System

|                     |                       |   |                   |
|---------------------|-----------------------|---|-------------------|
| <b>School: SET</b>  |                       | <b>Batch: 2021</b>  |                   |
| <b>Program: BSc</b> |                       | <b>Current Academic Year: 2021-22</b>   |                   |
| <b>Branch: CSE</b>  |                       | <b>Semester:4</b>   |                   |
| 1                   | Course Code           | Course Name: B.Sc.  |                   |
| 2                   | Course Title          | <b>Database Management Systems</b>  |                   |
| 3                   | Credits               | 4   |                   |
| 4                   | Contact Hours (L-T-P) | 4-0-0   |                   |
|                     | Course Status         | Core  |                   |
| 5                   | Course Objective      | <b>The objective of this course is to:</b> <ol style="list-style-type: none"> <li>To learn about basic concepts of databases, terms,</li> <li>Introduce students to build data base management systems</li> <li>Apply DBMS concepts to various examples and real life applications</li> </ol>   |                   |
| 6                   | Course Outcomes       | <b>At the end of the course student will be able to:</b> <p><b>CO1:</b> Explain the basics concepts of data base &amp; design an ER model for a given example from real world description.</p> <p><b>CO2:</b> Design &amp; Solve the given problem using Relational Algebra, Relational Calculus, SQL and PL/SQL.</p> <p><b>CO3:</b> Apply normalization techniques to reduce redundancy from the database.</p> <p><b>CO4:</b> To appraise the basic issues of Transaction processing, Serializability &amp; deadlock.</p> <p><b>CO5:</b> Determine the roles of concurrency control techniques in database design.</p> <p><b>CO6:</b> Design &amp; develop database system for real life problems.</p> |                   |
| 7                   | Course Description    | This course introduces basic aspects of data bases.   |                   |
| 8                   | Outline syllabus      | <b>Proposed No. of Lectures</b>   | <b>CO Mapping</b> |
|                     | <b>Unit 1</b>         | <b>INTRODUCTION TO DATABASES &amp; ENTITY–RELATIONSHIP (ER) MODEL</b>   |                   |
|                     | A                     | <b>12</b>   | CO1, CO6          |
|                     | B                     |   | CO1, CO6          |
|                     | C                     |   | CO1, CO6          |
|                     | <b>Unit 2</b>         | <b>RELATIONAL DATA MODEL &amp; CONCEPTS OF SQL</b>  |                   |
|                     | A                     | <b>13</b>   | CO1, CO2, CO6     |
|                     | B                     |   | CO1, CO2, CO6     |
|                     | C                     |   | CO1, CO2, CO6     |
|                     | <b>Unit 3</b>         | <b>RELATIONAL DATABASE DESIGN &amp; NORMALIZATION</b>   |                   |
|                     | A                     | <b>13</b>   | CO3,              |

|                        |   |  |     |          |
|------------------------|---|--|-----|----------|
|                        |   | Database, loss less join decompositions  |     | CO6      |
| B                      |   | Normal Forms: First, Second, Third normal forms and Boyce Codd normal form (BCNF), Multi-valued dependencies, fourth normal forms      |     | CO3, CO6 |
| C                      |   | Case Study based on Relational Database Design & Normalization   |     | CO3, CO6 |
|                        | <b>Unit 4</b>   | <b>TRANSACTION PROCESSING CONCEPTS</b>   |     |          |
| A                      |   | Introduction to Transaction processing; ACID property, Testing of Serializability, Serializability of Schedules,                       | 12  | CO4      |
| B                      |   | Conflict & View Serializable, Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Checkpoints, Deadlock, |     | CO4      |
| C                      |   | Case Study based on Transaction Processing System  |     | CO4      |
|                        | <b>Unit 5</b>   | <b>CONCURRENCY CONTROL TECHNIQUES</b>  |     |          |
| A                      |   | Concurrency Control, Two-Phase Locking Techniques for Concurrency Control, Time Stamping Protocols for Concurrency Control,            | 10  | CO5      |
| B                      |   | Validation Based Protocol, Multiple Granularity, Multi Version Schemes,  |     | CO5      |
| C                      |   | Case Study based on Oracle   |     | CO5      |
| Mode of examination    | Theory  |  |     |          |
| Weightage Distribution | CA  | MTE  | ETE |          |
|                        | 30%   | 20%  | 50% |          |
| Text book/s*           | 1. Korth, Silberschatz & Sudarshan, Data base Concepts, Tata McGraw-Hill<br>2. Elmasri, Navathe, Fundamentals of Database Systems, Pearson Education Inc.   |  |     |          |
| Other References       | 1. Thomas Connolly, Carolyn Begg, Database Systems: A Practical Approach to design, Implementation and Management, Pearson Education, Latest Edition.<br>2. Jeffrey D. Ullman, Jennifer Windon, A first course in Database Systems, Pearson Education.<br>3. Date C.J., An Introduction to Database Systems, Addison Wesley.<br>4. Richard T. Watson, Data Management: databases and organization, Wiley. |  |     |          |

### CO and PO Mapping

| S. No. | Course Outcome (CO)  | Program Outcomes (PO) & Program Specific Outcomes (PSO) |
|--------|--|---|
| 1.     | Explain the basics concepts of data base & design an ER model for a given example from real world description. | PO1, PO4, PO8, PO9, PO10                                |
| 2.     | Design & Solve the given problem using Relational Algebra, Relational Calculus, SQL and PL/SQL.                | PO1, PO2, PO4, PO8, PO10                                |
| 3.     | Apply normalization techniques to reduce redundancy from the database.   | PO1, PO2, PO3, PO4, PO8, PO10                           |
| 4.     | To appraise the basic issues of Transaction processing, Serializability & deadlock.                            | PO1, PO2, PO3, PO4, PO8                                 |
| 5.     | Determine the roles of concurrency control techniques in database design.                                      | PO1, PO2, PO3, PO4, PO10                                |
| 6.     | Design & develop database system for real life problems  | PO1, PO2, PO3, PO4, PO5, PO6, PO9, PO10, PSO1, PSO2     |



**PO and PSO mapping with level of strength for Course Name: Database Management Systems (Course Code: )**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3   | -   | -   | 3   | -   | -   | -   | 2   | 2   | 3    | -    | -    |
| CO2 | 3   | 3   | -   | 3   | -   | -   | -   | 3   | -   | 2    | -    | -    |
| CO3 | 3   | 3   | 3   | 3   | -   | -   | -   | 3   | -   | 2    | -    | -    |
| CO4 | 2   | 2   | 2   | 3   | -   | -   | -   | 2   | -   |      | -    | -    |
| CO5 | 2   | 2   | 2   | 3   | -   | -   | -   | -   | -   | 2    | -    | -    |
| CO6 | 2   | 3   | 3   | 3   | 2   | 2   | 2   | 3   | 3   | 3    | 2    | 2    |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code/ Name | PO1 | PO2 | PO3 | PO 4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PSO1 | PSO2 |
|-------------------|-----|-----|-----|------|-----|-----|-----|-----|-----|------|------|------|
| / DBMS            | 2.5 | 2.6 | 2.5 | 3    | 2   | 2   | 2   | 2.6 | 2.5 | 2.4  | 2    | 2    |

**Strength of Correlation: 1. Addressed to Slight (Low=1) extent**

**2. Addressed to Moderate (Medium=2)**

|                      |                       |   |                   |
|----------------------|-----------------------|---|-------------------|
| <b>School: SET</b>   |                       | <b>Batch : 2021-2024</b>  |                   |
| <b>Program: B.Sc</b> |                       | <b>Current Academic Year: 2021-22</b>   |                   |
| <b>Branch: CS/IT</b> |                       | <b>Semester: I</b>  |                   |
| 1                    | Course Code           | Course Name:  |                   |
| 2                    | Course Title          | <b>Digital Electronics &amp; Computer Organization</b>  |                   |
| 3                    | Credits               | 4   |                   |
| 4                    | Contact Hours (L-T-P) | 4-0-0   |                   |
|                      | Course Status         | UG  |                   |
| 5                    | Course Objective      | To provide students with an overview of digital electronics that forms the basic foundation of digital computer. It includes the number system, binary logic circuit and k-maps, evaluating circuit designs within the context of digital and combinational circuits. To understand the building blocks of computer and study various design issues   |                   |
| 6                    | Course Outcomes       | CO1: Define the basic logic operations and simplify using Boolean algebra and/or Karnaugh mapping techniques, sum of products (SOP) and product of sums (POS).<br>CO2: Illustrate combinatorial logic circuits and explain their operation.<br>CO3: Construct different types of sequential logic circuits using Flip Flops.<br>CO4: Analyze the basic structure and functional units of a digital computer & understand basic processing unit and organization of simple processor.<br>CO5: Explain hierarchical memory systems including cache memories & select appropriate interfacing standards for I/O devices.<br>CO6: Develop a real-life project applying the concepts of digital electronics and computer organization. |                   |
| 7                    | Course Description    | This course covers the core concepts of digital electronics that include AND, OR, NAND, NOR, NOT logic functions and integrated circuits, combinational and sequential logic circuits. The course also provides a study of Boolean algebra, binary and hexadecimal number systems, binary codes, and the analysis of the basic components and circuits used in semiconductor switching. This course also discusses the basic structure of a digital computer and used for understanding the organization of various units such as control unit, Arithmetic and Logical unit and Memory unit and I/O unit in a digital computer.   |                   |
| 8                    | Outline syllabus      | <b>Proposed No. of Lectures</b>   | <b>CO Mapping</b> |
|                      | <b>Unit 1</b>         | <b>Logic Gates &amp; Boolean Algebra</b>  |                   |
|                      | A                     | AND, OR, NOT, NAND, NOR, XOR, XNOR, NAND & NOR as Universal Gates   | CO1, CO6          |
|                      | B                     | Theorems, Simplification of Boolean Expression using Boolean Algebra, SOP & POS Forms, Realization of Boolean Expression using Gates  | CO1, CO6          |
|                      | C                     | K-Maps, Simplification of Boolean Expression using K-Maps (upto 4- variables)   | CO1, CO6          |
|                      | <b>Unit 2</b>         | <b>Combinational Logic Circuits</b>   |                   |
|                      | A                     | Half Adder & Half Subtractor, Full Adder & Full Subtractor  | CO2, CO6          |
|                      | B                     | Multiplexers & Demultiplexers, Implementation of Boolean equations using Multiplexer and Demultiplexer  | CO2, CO6          |
|                      | C                     | Encoders & Decoders, Comparator, Basic Concepts of A/D and D/A converters   | CO2, CO6          |
|                      | <b>Unit 3</b>         | <b>Sequential Logic Circuits: Synchronous &amp; Asynchronous</b>  |                   |
|                      | A                     | Latch, Flip Flops- R-S, J-K, Master-Slave J-K Flip-Flop, Race Condition, Removing Race Condition  | CO3, CO6          |
|                      | B                     | D Flip-Flop, T Flip-Flop, Sequential Circuits: Registers and Counters: Shift Registers, Ripple Counter, Synchronous Counter, Ring counter,  | CO3, CO6          |
|                      | C                     | Asynchronous Circuits: Analysis procedure, circuit with latches, Design procedure, Race free state assignment, hazards.   | CO3, CO6          |

|                        |  |     |     |           |          |
|------------------------|--|-----|-----|-----------|----------|
| <b>Unit 4</b>          | <b>Basic Computer Organization and Design</b>  |     |     | <b>12</b> |          |
| A                      | Digital computer: functional units and their interconnections, buses, Bus architecture, types of buses and bus arbitration. Bus and memory transfer, micro-operations  |     |     |           | CO4, CO6 |
| B                      | <b>Control Unit:</b> Processor organization: general register organization, stack organization and addressing modes  |     |     |           | CO4, CO6 |
| C                      | <b>Memory Unit:</b> Basic concept and hierarchy, semiconductor RAM memories and types, ROM memories and types.   |     |     | CO4, CO6  |          |
| <b>Unit 5</b>          | <b>Memory Management &amp; I/O Interfaces</b>  |     |     | <b>12</b> |          |
| A                      | Cache memories: concept and design issues (Performance, address mapping and replacement)   |     |     |           | CO5, CO6 |
| B                      | Peripheral devices, I/O interface, I/O ports, Interrupts: interrupt hardware, types of interrupts, Modes of Data Transfer: Programmed I/O, interrupt initiated I/O and Direct Memory Access  |     |     |           | CO5, CO6 |
| C                      | Case Study based on Memory Management  |     |     | CO5, CO6  |          |
| Mode of examination    | Theory   |     |     |           |          |
| Weightage Distribution | CA   | MTE | ETE |           |          |
|                        | 30%  | 20% | 50% |           |          |
| Text book/s*           | 1. Moris Mano, "Digital Logic and Computer Design", PHI Publications, 2002<br>2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", McGraw-Hill, Fifth Edition, Reprint 2012<br>3. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software Interface" |     |     |           |          |
| Other References       | 1. Digital Electronics (TMH) 1998: Malvino and Leach<br>2. Computer Organization and Architecture: William Stallings   |     |     |           |          |

### CO and PO Mapping

| S. No. | Course Outcome (CO)  | Program Outcomes (PO) & Program Specific Outcomes (PSO) |
|--------|--|---|
| 1.     | CO1: Define the basic logic operations and simplify using Boolean algebra and/or Karnaugh mapping techniques, sum of products (SOP) and product of sums (POS). | PO1, PO2, PO3, PO4, PO8, PO9, PO10, PSO1                |
| 2.     | CO2: Illustrate combinatorial logic circuits and explain their operation.  | PO1, PO2, PO3, PO4, PO8, PO10                           |
| 3.     | CO3: Construct different types of sequential logic circuits using Flip Flops.  | PO1, PO2, PO3, PO4, PO8, PO10, PSO1                     |
| 4.     | CO4: Analyze the basic structure and functional units of a digital computer & understand basic processing unit and organization of simple processor.           | PO1, PO2, PO3, PO4, PO8, PO10, PSO1                     |
| 5.     | CO5: Explain hierarchical memory systems including cache memories & select appropriate interfacing standards for I/O devices.                                  | PO1, PO2, PO3, PO4, PO6, PO10                           |
| 6.     | CO6: Develop a real-life project applying the concepts of digital electronics and computer organization.   | PO1, PO2, PO3, PO4, PO5, PO6, PO8, PO9, PO10, PSO1      |

**PO and PSO mapping with level of strength for Course Name: Digital Electronics & Computer Organization (Course Code: )**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3   | 3   | -   | 3   | -   | -   | -   | 2   | 2   | 3    | 3    | -    |
| CO2 | 3   | 3   | 3   | 3   | -   | -   | -   | 3   | -   | 2    | 3    | -    |
| CO3 | 3   | 3   | 3   | 3   | -   | -   | -   | 3   | -   | 3    | 2    | -    |
| CO4 | 3   | 3   | 3   | 3   | -   | -   | -   | 3   | -   | 3    | 3    | -    |
| CO5 | 2   | 2   | 2   | 3   | -   | 2   | -   | -   | -   | 2    | -    | -    |
| CO6 | 2   | 3   | 3   | 3   | 2   | 2   | -   | 3   | 3   | 3    | 3    | -    |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code/ Name                             | PO1 | PO2 | PO3 | PO 4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PSO1 | PSO2 |
|---|-----|-----|-----|------|-----|-----|-----|-----|-----|------|------|------|
| / Digital Electronics & Computer Organization | 2.7 | 2.8 | 2.8 | 3.0  | 2.0 | 2.0 | -   | 2.8 | 2.5 | 2.7  | 2.8  | -    |

**Strength of Correlation:** 1. Addressed to Slight (Low=1) *extent*

2. Addressed to Moderate (Medium=2)

|                   |                       |   |  |            |
|-------------------|-----------------------|---|--|------------|
| <b>School:</b>    |                       | <b>School of Engineering and technology</b>   |  |            |
| <b>Department</b> |                       | <b>Department of Computer Science and Engineering</b>   |  |            |
| <b>Program:</b>   |                       | <b>BSC-IT</b>   |  |            |
| <b>Branch:</b>    |                       |   |  |            |
| 1                 | Course Code           |   |  |            |
| 2                 | Course Title          | Discrete Structures and Data Structures   |  |            |
| 3                 | Credits               | 4   |  |            |
| 4                 | Contact Hours (L-T-P) | 4-0-0   |  |            |
|                   | Course Status         | Core  |  |            |
| 5                 | Course Objective      | This course provides a mathematical foundation for subsequent study in Computer Science, as well as developing the skills necessary to solve practical problems.  |  |            |
| 6                 | Course Outcomes       | <p>After the completion of this course, students will be able to:</p> <p>CO-1. <b>Apply</b> the basic principles of sets and operations in sets.</p> <p>CO-2. <b>Construct</b> and prove models by using algebraic structures.</p> <p>CO-3. <b>Classify</b> logical notation and determine if the argument is or is not valid.</p> <p>CO-4. <b>Apply</b> the concepts of data structure, data type and ADT and appropriate data structures and Choose the suitable data structures like arrays, linked list, stacks and queues to solve real world problems efficiently.</p> <p>CO-5. <b>Represent</b> and manipulate data using nonlinear data structures like trees and graphs to design algorithms for various applications.</p> <p>CO-6 <b>Formulate</b> new solutions for programming problems as per industry standards.</p>  |  |            |
| 7                 | Course Description    | <p>The purpose of this course is to understand and use (abstract) discrete structures that are backbones of computer science. A basic understanding of discrete mathematical topics is fundamental for work in computer science. Many students of this course will find they have familiarity with some of the topics: for instance, truth tables, logical propositions, elements of set theory, as well as basic notions of functions and mathematical induction. In this course we will discover that logical propositions are the underlying model of discrete systems. From this modest beginning we develop algorithms and prove their efficacy. Topics include propositional and predicate logic, basic proof techniques, set algebra and Boolean algebra, recursion and induction. The knowledge gained will be extremely useful in upper level of computer science classes.</p> |  |            |
| 8                 | Outline syllabus      |   |  | CO Mapping |
|                   | <b>Unit 1</b>         | <b>Introduction to Set Theory, Relations and Functions.</b>   |  |            |
|                   | A                     | Set Theory: Introduction, Combination of sets, Multi sets, ordered pairs, Set Identities.   |  | CO1        |
|                   | B                     | Relations: Definition, Operations on relations, Properties of relations, Composite Relations, Equality of relations, Order of relations.  |  | CO1        |
|                   | C                     | Functions: Definition, Classification of functions, Operations on functions, Recursively defined functions.   |  | CO1        |

|  |                        |  |     |     |              |
|--|------------------------|--|-----|-----|--------------|
|  | <b>Unit 2</b>          | <b>Algebraic Structures</b>  |     |     |              |
|  | A                      | Definition, Groups, Subgroups and order, Cyclic Groups, Cosets, Lagrange's theorem, Normal Subgroups,  |     |     | CO2          |
|  | B                      | Homomorphism's, Definition and elementary properties of Rings and Fields, Integers Modulo n.   |     |     | CO2          |
|  | C                      | Partial order sets: Definition, Partial order sets, Combination of partial order sets, Hasse diagram.  |     |     | CO2          |
|  | <b>Unit 3</b>          | <b>Logics and Mathematical Induction</b>   |     |     |              |
|  | A                      | Propositional Logic: Proposition, well formed formula, Truth tables, Tautology, Satisfiability, Contradiction, Algebra of proposition, Theory of Inference, Natural Deduction.   |     |     | CO1,CO3      |
|  | B                      | Predicate Logic: First order predicate, well formed formula of predicate, quantifiers, Inference theory of predicate logic.  |     |     | CO1,CO3      |
|  | C                      | Natural Numbers: Introduction, Mathematical Induction, Variants of Induction , Definition, Properties of lattices – Bounded, Complemented, Modular and Complete Lattice, Morphisms of lattices.  |     |     | CO1,CO3      |
|  | <b>Unit 4</b>          | <b>Introduction to data structures</b>   |     |     |              |
|  | A                      | Data Structure – Definition, Operations and Applications, Abstract Data Types, Algorithm – Definition, Introduction to Complexity, Big OH notation, Time and Space tradeoffs.  |     |     | CO4          |
|  | B                      | Arrays and Linked list: Implementation of One Dimensional Arrays, Multidimensional Arrays, Applications of Arrays, Address Calculation, Matrix Operations, Concept of Linked List, Representation of linked List in memory, Operations on a Linked List. More types of linked list: Doubly Linked list, Header Linked List, Two way List and Circular linked list. |     |     | CO4          |
|  | C                      | Stacks & Queues: Concepts of Stack, Operation on Stack, Array Representation of Stack, Arithmetic Expression POLISH Notation, Concepts of Queue, Operation on Queue, Representation of queues, Other types of queue: Priority Queues, Deque and Circular queue.  |     |     | CO4          |
|  | <b>Unit 5</b>          | <b>Trees and Graph Theory.</b>   |     |     |              |
|  | A                      | Trees: Definition, Binary tree, Binary tree traversal, Binary search tree.   |     |     | CO4,CO5      |
|  | B                      | Graphs: Definition and terminology, Representation of graphs.  |     |     | CO4,CO5      |
|  | C                      | Multi graphs, Bipartite graphs, Planar graphs, Isomorphism and Homeomorphism of graphs, Euler and Hamiltonian paths, Graph colouring.<br><b>Industry Problem solving skills, practice of interview questions.</b>  |     |     | CO4,CO5, CO6 |
|  | Mode of examination    | Theory/Jury/Practical/Viva   |     |     |              |
|  | Weightage Distribution | CA   | MTE | ETE |              |
|  |                        | 30%  | 20% | 50% |              |
|  | Text book/s*           | 1) <i>I. C. L. Liu, Elements of Discrete Mathematics, second edition 1985, McGraw-Hill Book Company. Reprinted 2000.</i><br>2) <i>Jean Paul Trembley, R Manohar, "Discrete</i>   |     |     |              |

|  |                  |   |  |
|--|------------------|---|--|
|  |                  | <p><i>Mathematical Structures with Application to Computer Science”, McGraw-Hill.</i></p> <p>3) <i>K. H. Rosen, Discrete Mathematics and applications, fifth edition 2003, Tata McGraw Hill Publishing Company.</i></p> <p>4) <i>Lipschutz, “Data Structures” Schaum’s Outline Series, TMH</i></p>  |  |
|  | Other References | <p>1) <i>J.L. Mott, A. Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India.</i></p> <p>2) <i>Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein “Data Structures Using C and C++”, PHI</i></p> <p>3) <i>Horowitz and Sahani, “Fundamentals of Data Structures”, Galgotia Publication</i></p> |  |

### CO and PO Mapping

| S. No. | Course Outcome  | Program Outcomes (PO) & Program Specific Outcomes (PSO) |
|--------|---|---|
| 1.     | <b>CO1: Apply</b> the basic principles of sets and operations in sets.  | PO1,PO4 ,PSO2   |
| 2.     | <b>CO2: Construct</b> and prove models by using algebraic structures.   | PO3,PO4,PSO3,PSO4                                       |
| 3.     | <b>CO3: Classify</b> logical notation and determine if the argument is or is not valid.   | PO3,PSO2  |
| 4.     | <b>CO4: Apply</b> the concepts of data structure, data type and ADT and appropriate data structures and Choose the suitable data structures like arrays, linked list, stacks and queues to solve real world problems efficiently. | PO1, PO3, PSO1  |
| 5.     | <b>CO5:Represent</b> and manipulate data using nonlinear data structures like trees and graphs to design algorithms for various applications.   | PO2, PO3, PO9, PSO1, PSO2                               |
| 6.     | <b>CO6:Formulate</b> new solutions for programming problems as per industry standards.  | PO1, PO3, PO4, PO5, PO9, PSO1, PSO2, PSO3               |

### PO and PSO mapping with level of strength for Course Name Discrete Structures and Data Structures (Course Code **yyyy**)

| Course Code_ Course Name                | CO's | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 |
|---|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| Discrete Structures and Data Structures | CO1  | 3    | 3    | 2    | 1    | 1    | 1    | 1    | 2    | 1    | 3     |       | 2     |
|   | CO2  | 3    | 3    | 2    | 2    | 1    | 1    | 1    | 2    | 1    | 3     |       | 2     |
|   | CO3  | 3    | 3    | 1    | 2    | 1    | 1    | 1    | 2    | 1    | 2     |       | 3     |
|   | CO4  |      | 2    | 2    |      |      |      |      | 2    |      |       | 1     | 2     |
|   | CO5  |      | 2    | 2    |      |      |      |      |      | 2    |       | 1     | 2     |
|   | CO6  |      |      | 1    | 2    |      |      |      |      |      | 2     | 3     | 2     |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code | Course Name               | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 |
|-------------|---------------------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
|             | Discrete & Data Structure | 2.83 | 2.67 | 1.67 | 1.67 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 2.67  |       | 2.50  |

### *Strength of Correlation*

- 1. Addressed to Slight (Low=1) extent*
- 2. Addressed to Moderate (Medium=2) extent*
- 3. Addressed to Substantial (High=3) extent*



|                   |                       |   |  |               |
|-------------------|-----------------------|---|--|---------------|
| <b>School:</b>    |                       | <b>School of Engineering and technology</b>   |  |               |
| <b>Department</b> |                       | <b>Department of Computer Science and Engineering</b>   |  |               |
| <b>Program:</b>   |                       | <b>BSC-IT</b>   |  |               |
| <b>Branch:</b>    |                       |   |  |               |
| 1                 | Course Code           |   |  |               |
| 2                 | Course Title          | Operating Systems and Unix shell Programming  |  |               |
| 3                 | Credits               | 4   |  |               |
| 4                 | Contact Hours (L-T-P) | 4-0-0   |  |               |
|                   | Course Status         | Core  |  |               |
| 5                 | Course Objective      | <ol style="list-style-type: none"> <li>1. This course introduces the challenges for designing the operating systems.</li> <li>2. Includes different design principles and algorithms.</li> <li>3. Evaluation of algorithms proposed.</li> <li>4. Implementation of algorithms and utilities.</li> </ol>   |  |               |
| 6                 | Course Outcomes       | <p><b>CO1: Define</b> role, responsibilities, features, and design of operating system.</p> <p><b>CO2: Evaluate</b> the strengths and weaknesses of the algorithms. And Identify the challenges and apply suitable algorithms for operating system.</p> <p><b>CO3: Implement</b> tools and utility of operating system.</p> <p><b>CO4: Apply</b> various memory management and memory management and to understand file and disk management and analyzing it.</p> <p><b>CO5: Understand</b> the concepts of unix and shell programming.</p> <p><b>CO6: Design</b> and develop solutions to real world problem using Linux</p> |  |               |
| 7                 | Course Description    | This course introduces the design principles of operating systems, resource management, identifying challenges and applying respective algorithms. This course will also provide the basic of unix and shell programming.   |  |               |
| 8                 | Outline syllabus      |   |  | CO Mapping    |
|                   | <b>Unit 1</b>         | <b>Introduction to Operating System Concepts</b>  |  |               |
|                   | A                     | Operating System Concepts and functions, Comparison of different Operating system, Open-Source Operating Systems.   |  | CO1, CO2      |
|                   | B                     | Types of Operating Systems (Batch, Multiprogramming, Multi-Tasking, Multiprocessing, Distributed and Real Time Operating System), Operating System Structure, Operating System Services.  |  | CO1, CO2      |
|                   | C                     | Operating System Structure, System Components, Operating System Services, Kernels, Monolithic and Microkernel Systems.  |  | CO1, CO2      |
|                   | <b>Unit 2</b>         | <b>Process Management and Scheduling</b>  |  |               |
|                   | A                     | Process Concepts (PCB, Process States, Process Operations)  |  | CO1, CO2      |
|                   | B                     | CPU Scheduling: Concept, Types of schedulers (Short term, Long term, Middle term), Dispatcher,  |  | CO1, CO2, CO4 |

|  |                        |   |     |              |
|--|------------------------|---|-----|--------------|
|  | C                      | Performance Criteria CPU Scheduling Algorithms( FCFS, SJF, Priority, Round Robin, Multilevel Queue, Multilevel feedback Queue)  |     | CO1,CO2,CO4  |
|  | <b>Unit 3</b>          | <b>Deadlock Handling</b>  |     |              |
|  | A                      | Race condition, Critical sections, Mutual exclusion,  |     | CO1,CO2      |
|  | B                      | Deadlock concepts & Handling Techniques: Avoidance, Prevention  |     | CO1,CO3      |
|  | C                      | Deadlock Detection & Recovery   |     | CO4          |
|  | <b>Unit 4</b>          | <b>Memory Management and File Management</b>  |     |              |
|  | A                      | Memory Hierarchy, Memory Management Unit, Paging, Segmentation  |     | CO1, CO5     |
|  | B                      | Virtual memory concept, demand paging, Page replacement algorithms(FCFS, Optimal, LRU),   |     | CO3, CO5     |
|  | C                      | File Concept ,File operations, File Directories, Case study of Windows Operating System, Disk structure , Disk scheduling(FCFS,SSTF, SCAN, LOOK,C-SCAN, C-LOOK)   |     | CO2,CO3, CO5 |
|  | <b>Unit 5</b>          | <b>Unix and Shell Scripting</b>   |     |              |
|  | A                      | Unix file system, Commands related to Process and File Handling.  |     | CO1, CO2,CO3 |
|  | B                      | Introduction to shell and various type of shell, Various editors present in linux, Different modes of operation in vi editor,   |     | CO1, CO4,CO6 |
|  | C                      | Introduction to shell script, Writing and executing the shell script, Shell variable (user defined and system variables)<br>System calls, Using system calls, Pipes and Filters, Decision making in Shell Scripts (If else, switch), Loops in shell, Functions, Utility programs (cut, paste, join, tr , uniq utilities), Pattern matching utility (grep) |     | CO1, CO4,CO6 |
|  | Mode of examination    | Theory/Jury/Practical/Viva  |     |              |
|  | Weightage Distribution | CA  | MTE | ETE          |
|  |                        | 30%   | 20% | 50%          |
|  | Text book/s*           | 1. Silberschatz G, <i>Operating System Concepts</i> , Wiley   |     |              |
|  | Other References       | 1. W. Stalling, "Operating System", Maxwell Macmillan<br>2. Tannenbaum A S, <i>Operating System Design and Implementation</i> , Prentice Hall India<br>3. Milenkovic M, <i>Operating System Concepts</i> , McGraw Hill  |     |              |

### CO and PO Mapping

| S. No. | Course Outcome   | Program Outcomes (PO) & Program Specific Outcomes (PSO) |
|--------|--|---|
| 1.     | <b>CO1: Define</b> role, responsibilities, features, and design of operating system.   | PO1,PO2,PO3,PO4,PSO1                                    |
| 2.     | <b>CO2: Evaluate</b> the strengths and weaknesses of the algorithms. And Identify the challenges and apply suitable algorithms for operating system. | PO1, PO3, PO4, PSO2                                     |
| 3.     | <b>CO3: Implement</b> tools and utility of operating system.   | PO1,PO2,PO3,PO4   |
| 4.     | <b>CO4: Apply</b> various memory management and memory management and to understand file and disk management and analyzing it.                       | PO9, PO10,PO11  |
| 5.     | <b>CO5: Understand</b> the concepts of unix and shell programming.   | PO1,PO2,PO8,PO9,PO10,PSO1                               |
| 6.     | <b>CO6: Design</b> and develop solutions to real world problem using Linux   | PO1,PO2,PO10,PSO1,PSO2                                  |

### PO and PSO mapping with level of strength for Course Name Operating Systems and Unix shell Programming (Course Code **yyyy**)

| Course Code_<br>Course Name | CO's | PO 1 | PO 2 | PO 3 | PO4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO2 |
|-----------------------------|------|------|------|------|-----|------|------|------|------|------|-------|-------|------|
| OS & shell<br>Programming   | CO1  | 3    | 3    | 3    | 3   | --   | --   | --   | 2    | 2    | 1     | 3     | 2    |
|                             | CO2  | 3    | 2    | 3    | 3   | --   | --   | --   | 2    | 2    | 2     | 2     | 3    |
|                             | CO3  | 3    | 3    | 3    | 3   | --   | --   | --   | 1    | 1    | 1     | 3     | 2    |
|                             | CO4  | 2    | 2    | 2    | 2   | 1    | --   | --   | 2    | 3    | 3     | 2     | 2    |
|                             | CO5  | 2    | 2    | 2    |     |      |      |      | 3    | 3    | 1     | 3     |      |
|                             | CO6  | 3    | 2    |      |     |      |      |      |      |      | 2     | 2     | 2    |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code | Course Name            | PO 1 | PO2  | PO3  | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 |
|-------------|------------------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
|             | OS & shell Programming | 2.83 | 2.67 | 1.67 | 1.67 | 1.00 | 1.00 | 1.00 | 2.00 | 1.00 | 2.67  |       | 2.50  |

### Strength of Correlation

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

|                   |                       |   |                         |
|-------------------|-----------------------|---|-------------------------|
| <b>School:</b>    |                       | <b>School of Engineering and technology</b>   |                         |
| <b>Department</b> |                       | <b>Department of Computer Science and Engineering</b>   |                         |
| <b>Program:</b>   |                       | <b>BSC-IT</b>   |                         |
| <b>Branch:</b>    |                       |   |                         |
| 1                 | Course Code           |   |                         |
| 2                 | Course Title          | Operating Systems Using Linux Lab   |                         |
| 3                 | Credits               | 2   |                         |
| 4                 | Contact Hours (L-T-P) | 0-0-4   |                         |
|                   | Course Status         | Compulsory  |                         |
| 5                 | Course Objective      | Introduces the UNIX/Linux operating system, including: task scheduling and management, memory management, input/output processing, internal and external commands, shell configuration, and shell customization. Explores the use of operating system utilities such as text editors, electronic mail, file management, scripting, and C/C++ compilers  |                         |
| 6                 | Course Outcomes       | <p>On completion of this course the student should be able to:</p> <p>CO1: To Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.</p> <p>CO2: To accomplish typical personal, office, technical, and software development tasks.</p> <p>CO3: To Analyze system performance and network activities. Effectively use software development tools including libraries, preprocessors, compilers, linkers, and make files.</p> <p>CO4: Comprehend technical documentation, prepare simple readable user documentation and adhere to style guidelines.</p> <p>CO5: Analyze various utilities to structure the Linux Program</p> <p>CO6: Implement the Linux utilities to successfully write a program</p> |                         |
| 7                 | Course Description    | This courses introduces Linux Operating System  |                         |
| 8                 | Outline syllabus      |   | CO Mapping              |
|                   | <b>Unit 1</b>         | <b>Practical based on Basic Linux Commands</b>  |                         |
|                   |                       | Introduction to Unix, Unix architecture, Features of Unix, Internal & External Commands, Basic unix commands: pwd, cd, mkdir, rmdir, ls, help, man, whatis  | CO1, CO2, CO4           |
|                   | <b>Unit 2</b>         | <b>Practical based on File Management</b>   |                         |
|                   |                       | Unix file system, file permission, file handling commands: cat, touch, cp, rm, mv, more/less, lp, wc, cmp, diff, comm., dos2unix & unix2dos, gzip&gunzip, zip & unzip, tar  | CO1, CO2, CO3, CO4      |
|                   | <b>Unit 3</b>         | <b>Practical based on process Management</b>  |                         |
|                   |                       | Process basics: PID, PPID, ps, process states, zombies, foreground and background processes, nice, kill.  | CO2, CO3, CO4           |
|                   | <b>Unit 4</b>         | <b>Practical Based on Filters</b>   |                         |
|                   |                       | Simple filters: pr, head, tail, cut, paste, sort, nl, tr, grep  | CO2, CO3, CO4           |
|                   | <b>Unit 5</b>         | <b>Practical Based on Shell Scripting</b>   |                         |
|                   |                       | Shell scripts, execution of shell scripts, using command line arguments, loops, condition   | CO1, CO2, CO3, CO4, CO6 |

|  |                        |   |     |     |  |
|--|------------------------|---|-----|-----|--|
|  | Mode of examination    | Jury/Practical/Viva   |     |     |  |
|  | Weightage Distribution | CA  | MTE | ETE |  |
|  |                        | 60%   | 0%  | 40% |  |
|  | Text book/s*           | 1. Sumitabha Das, "Unix Concepts and Applications", Tata McGraw Hill.   |     |     |  |
|  | Other References       | 1. Unix Shell programming by Stephen G. Kochan and Patric Wood<br>2. Unix and shell programming by Richard F. Gilberg and Behrouz A. forouzan |     |     |  |

**PO and PSO mapping with level of strength for Course Name Operating Systems Using Linux Lab (Course Code **yyyyy**)**

| Course Code_<br>Course Name | CO's | PO 1 | PO 2 | PO 3 | PO4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO2 |
|-----------------------------|------|------|------|------|-----|------|------|------|------|------|-------|-------|------|
| OS & shell Programming lab  | CO1  | 3    | 3    | 3    | 3   | --   | --   | --   | 2    | 2    | 1     | 3     | 2    |
|                             | CO2  | 3    | 2    | 3    | 3   | --   | --   | --   | 2    | 2    | 2     | 2     | 3    |
|                             | CO3  | 3    | 3    | 3    | 3   | --   | --   | --   | 1    | 1    | 1     | 3     | 2    |
|                             | CO4  | 2    | 2    | 2    | 2   | 2    | --   | --   | 2    | 3    | 3     | 2     | 2    |
|                             | CO5  | 2    | 2    | 2    | 2   | 2    | --   | --   | 2    | 3    | 3     | 2     | 2    |
|                             | CO6  | 2    | 2    | 2    | 2   | 2    | --   | --   | 2    | 3    | 3     | 2     | 2    |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code | Course Name                | PO 1 | PO2  | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 |
|-------------|----------------------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
|             | OS & shell Programming lab | 2.5  | 2.33 | 2.5  | 2.5  | 1.0  |      |      | 1.8  | 2.3  | 2.1   | 2.3   | 2.1   |

**Strength of Correlation**

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

|                        |                       |   |  |
|------------------------|-----------------------|---|--|
| <b>School: SET</b>     |                       | <b>Batch :</b>  |  |
| <b>Program: BSC-IT</b> |                       | <b>Current Academic Year: 2021</b>  |  |
| <b>Branch:</b>         |                       | <b>Semester:1</b>   |  |
| 1                      | Course Code           |   | Course Name: Problem solving using C Programming |
| 2                      | Course Title          | Problem solving using C Programming   |  |
| 3                      | Credits               | 4   |  |
| 4                      | Contact Hours (L-T-P) |   |  |
|                        | Course Status         | Core  |  |
| 5                      | Course Objective      | <ol style="list-style-type: none"> <li>1. Learn basic programming constructs –data types, decision structures, control structures in C</li> <li>2. learning logic aptitude programming in c language</li> <li>3. Developing software in c programming</li> </ol>  |  |
| 6                      | Course Outcomes       | <p>Students will be able to:</p> <p>CO1: <b>Demonstrate</b> the hardware components of computer system algorithm, and flow chart for the given problem.</p> <p>CO2: <b>Develop</b> better understanding of basic concepts of C programming.</p> <p>CO3: <b>Create</b> and implement logic using array and function.</p> <p>CO4: <b>Construct</b> and implement the logic based on the concept of strings and pointers.</p> <p>CO5: <b>Apply</b> user-defined data types and I/O operations in file.</p> <p>CO6: <b>Design</b> and develop solutions to real world problems using C.</p> |  |
| 7                      | Course Description    | Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm   |  |
| 8                      | Outline syllabus      |   | CO Mapping                                       |
|                        | <b>Unit 1</b>         | <b>Computer Fundamentals And Basic Computer Organization</b>  |  |
|                        | A                     | <b>Computer Fundamentals:</b> Introduction to Computers: Characteristics of Computers, Uses of computers, Types and generations of Computers.   | CO1,   |
|                        | B                     | Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices. Number System  | CO1  |
|                        | C                     | <b>Techniques of Problem Solving:</b> Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.   | CO1  |
|                        | <b>Unit 2</b>         | <b>Introduction to C Programming</b>  |  |

|                        |   |             |     |
|------------------------|---|-------------|-----|
| A                      | Introduction to C programming language, Data types, Variables, Constants, Identifiers and keywords, Storage classes   | CO2,<br>CO6 |     |
| B                      | Operators and expressions, Types of Statements: Assignment, Control, jumping.   | CO2,<br>CO6 |     |
| C                      | Control statements: Decisions, Loops, break, continue   | CO2,<br>CO6 |     |
| <b>Unit 3</b>          | <b>Arrays and Functions</b>   |             |     |
| A                      | Arrays: One dimensional and multi dimensional arrays: Declaration, Initialization and array manipulation  | CO3,<br>CO6 |     |
| B                      | Functions: Definition, Declaration/Prototyping and Calling, Types of functions, Parameter passing: Call by value, Call by reference.  | CO3,<br>CO6 |     |
| C                      | Passing and Returning Arrays from Functions, Recursive Functions.   | CO3,<br>CO6 |     |
| <b>Unit 4</b>          | <b>Pre-processors and Pointers</b>  |             |     |
| A                      | Pre-processors: Types, Directives, Pre-processors Operators (#,##,\)  | CO4,<br>CO6 |     |
| B                      | Pointer: Introduction, declaration of pointer variables, Operations on pointers: Pointer arithmetic, Arrays and pointers, Dynamic memory allocation.  | CO4,<br>CO6 |     |
| C                      | String: Introduction, predefined string functions, Manipulation of text data, Command Line Arguments.   | CO4,<br>CO6 |     |
| <b>Unit 5</b>          | <b>User Defined Data Types and File Handling</b>  |             |     |
| A                      | Structure and Unions: Introduction, Declaration, Difference, Application, Nested structure, self-referential structure, Array of structures, Passing structure in function.   | CO5,<br>CO6 |     |
| B                      | Files: Introduction, concept of record, I/O Streaming and Buffering, Types of Files: Indexed file, sequential file and random file,   | CO5,<br>CO6 |     |
| C                      | Creating a data file, Opening and closing a data file, Various I/O operations on data files: Storing data or records in file, adding records, Retrieving, and updating Sequential file/random file.   | CO5,<br>CO6 |     |
| Mode of examination    | Theory  |             |     |
| Weightage Distribution | CA  | MTE         | ETE |
|                        | 30%   | 20%         | 50% |
| Text book/s*           | Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>   |             |     |
| Other References       | <ol style="list-style-type: none"> <li>1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004.</li> <li>2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999</li> </ol> |             |     |

### CO and PO Mapping

| S. No. | Course Outcome  | Program Outcomes (PO) & Program Specific Outcomes (PSO) |
|--------|---|---|
| 1.     | <b>CO1: demonstrate</b> the hardware components of computer system algorithm, and flow chart for the given problem. | <b>PO1,PO2,PO3,PO4, PO10, PSO1,PSO2</b>                 |
| 2.     | <b>CO2:</b> develop better understanding of basic concepts of C programming.  | <b>PO1,PO2,PO3,PO4, PO10, PSO1,PSO2</b>                 |
| 3.     | <b>CO3:</b> create and implement logic using array and function.  | <b>PO1,PO2,PO3,PO4, PO10, PSO1,PSO2</b>                 |
| 4.     | <b>CO4:</b> construct and implement the logic based on the concept of strings and pointers.                         | <b>PO1,PO2,PO3,PO4, PO10, PSO1,PSO2</b>                 |
| 5.     | <b>CO5:</b> apply user-defined data types and I/O operations in file.   | <b>PO1,PO2,PO3,PO4, PO10, PSO1,PSO2</b>                 |
| 6      | <b>CO6:</b> design and develop solutions to real world problems using C.  | <b>PO1,PO2,PO3,PO4,PO5,PO6,PO8,PSO1 PSO2.</b>           |

### **PO and PSO mapping with level of strength for Course Name Problem solving using C Programming (Course Code:XXXX )**

|     | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO1 | PSO2 |
|-----|------|------|------|------|------|------|------|------|------|-------|------|------|
| CO1 | 1    | 3    | 2    | 2    | -    | -    | -    | -    |      | 1     | 2    | 3    |
| CO2 | 2    | 3    | 3    | 2    | 2    | -    | -    | -    |      | 1     | 2    | 3    |
| CO3 | 3    | 3    | 2    | 2    | 2    | -    | -    | -    | -    | 1     | 2    | 3    |
| CO4 | 3    | 3    | 2    | 2    | 2    | -    | -    | -    | -    | 1     | 2    | 3    |
| CO5 | 3    | 3    | 2    | 2    | 2    | -    | -    | -    | -    | 1     | 2    | 3    |
| CO6 | 3    | 3    | 3    | 2    | 2    | 2    | -    | 2    |      | 1     | 2    | 3    |



*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code | Course Name                         | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PS O 1 | PS O 2 |
|-------------|-------------------------------------|------|------|------|------|------|------|------|------|------|-------|--------|--------|
| xxxx        | Problem solving using C Programming | 2.5  | 3    | 2.3  | 1.5  | 2.0  |      |      |      |      | 1     | 2.     | 3      |

### *Strength of Correlation*

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

**Syllabus: : Programming for problem solving Lab**


---

|                        |                       |  |                 |
|------------------------|-----------------------|--|-----------------|
| <b>School: SET</b>     |                       | <b>Batch: 2021</b>   |                 |
| <b>Program: BSC-IT</b> |                       | <b>Current Academic Year: 2021</b>   |                 |
| <b>Branch:</b>         |                       | <b>Semester: I</b>   |                 |
| 1                      | Course Code           | XXXX   |                 |
| 2                      | Course Title          | Programming for problem solving Lab  |                 |
| 3                      | Credits               | 2  |                 |
| 4                      | Contact Hours (L-T-P) | 0-0-4  |                 |
|                        | Course Status         | Compulsory   |                 |
| 5                      | Course Objective      | <ol style="list-style-type: none"> <li>1. Learn basic programming constructs –data types, decision structures, control structures in C</li> <li>2. learning logic aptitude programming in c language</li> <li>3. Developing software in c programming</li> </ol>   |                 |
| 6                      | Course Outcomes       | Students will be able to:<br><b>CO1: Implement</b> core concept of c Programming<br><b>CO2: develop</b> programs using Array and String<br><b>CO3: create</b> Functions for any problem<br><b>CO4: Use</b> Union and Structure to write any program<br><b>CO5: implement</b> concept of Pointers<br><b>CO6: design</b> a real world problem with the help of c programming |                 |
| 7                      | Course Description    | Programming for problem solving gives the Understanding of C programming and implement code from flowchart or algorithm  |                 |
| 8                      | Outline syllabus      |  | CO Mapping      |
|                        | <b>Unit 1</b>         | <b>Logic Building</b>  | <b>CO1, CO6</b> |
|                        |                       | Draw flowchart for finding leap year<br>Write a c Program to Add Two Integers<br>Write a program to create a calculator<br>Write a program to add ‘n’ numbers.<br>Write a program to find the area and circumference of a circle.<br>Write a program to swap two numbers with or without use of a third variable.  |                 |
|                        | <b>Unit 2</b>         | <b>Introduction to C Programming AND</b>   | <b>CO2, CO6</b> |

|  |               |   |                 |
|--|---------------|---|-----------------|
|  |               | <p>Write a c program to convert length meter to cm</p> <p>Write a c program to convert temp</p> <p>Write a c program to swap two numbers</p> <p>Write a program to find largest among two and three numbers.</p> <p>Write a program to find the roots of a quadratic equation (real and imaginary).</p> <p>Write a menu-driven program using Switch case to calculate the followings:</p> <ol style="list-style-type: none"> <li>i. Area of a circle</li> <li>ii. Area of a square</li> <li>iii. Volume of a sphere</li> </ol> <p>Write a program to check whether the given number is Armstrong or not.</p>  |                 |
|  | <b>Unit 3</b> | <b>Arrays and Functions</b>   | <b>CO3, CO6</b> |
|  |               | <p>Write a c program to calculate the average using arrays</p> <p>Write a c program to find the largest element of the array</p> <p>Write a program to calculate the factorial of the given number using function.</p> <p>Write a program to find the Fibonacci series.</p> <p>Write a program to find the sum &amp; reverse of digits and check whether it is palindrome or not.</p> <p>Write a program to multiply two matrices.</p> <p>Write a program to sort the elements of an integer array.</p> <p>Write a program to calculate factorial using recursive function.</p> <p>Write a program to show the use macros.</p> <p>Write a program to implement call by value and call by reference.</p> |                 |
|  | <b>Unit 4</b> | <b>Pre-processors and Pointers</b>  | <b>CO4, CO6</b> |
|  |               | <p>Write a c program to swap two values using pointers</p> <p>Write a c program to find largest number from array using pointers</p> <p>Write a program to access array element using pointers.</p> <p>Write a program to count vowels and consonants in a string using pointer.</p> <p>Write a program to perform the string operations.</p> <p>To write a program to print the employee details of employees using structure.</p>   |                 |

|  |   |  |                 |     |     |     |    |     |  |
|--|---|--|-----------------|-----|-----|-----|----|-----|--|
|  | <b>Unit 5</b>   | <b>User Defined Data Types and File Handling</b>   | <b>CO5, CO6</b> |     |     |     |    |     |  |
|  |   | Write a c program to store information of a student using structure<br>Write a c program to store information of a student using union<br>Write a program to create array of structures.<br>Write a program to perform file I/O operations.<br>A program to display college address using pointers and structures<br>A program to write data file and read data from file<br>A program to write integer data into file and read it from file<br>A program to write product details<br>A program to use command line arguments in files |                 |     |     |     |    |     |  |
|  | Mode of examination   | Practical  |                 |     |     |     |    |     |  |
|  | Weightage Distribution  | <table border="1"> <tr> <td>CA</td> <td>MTE</td> <td>ETE</td> </tr> <tr> <td>60%</td> <td>0%</td> <td>40%</td> </tr> </table>  | CA              | MTE | ETE | 60% | 0% | 40% |  |
| CA   | MTE   | ETE  |                 |     |     |     |    |     |  |
| 60%  | 0%  | 40%  |                 |     |     |     |    |     |  |
|  | Text book/s*  | Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>  |                 |     |     |     |    |     |  |
|  | Other References  | 4. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004.<br>5. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999  |                 |     |     |     |    |     |  |
| <b>Course outline</b><br>This course implements array and pointer and Recursive applications. The course talks primarily about Array, string, functions, structure & union and Pointers etc. |   |  |                 |     |     |     |    |     |  |
| <b>Course Evaluation</b>   |   |  |                 |     |     |     |    |     |  |
| Attendance   | None  |  |                 |     |     |     |    |     |  |
| Any other  | CA judged on the practicals conducted in the lab , weightage may be specified   |  |                 |     |     |     |    |     |  |
| <b>References</b>  |   |  |                 |     |     |     |    |     |  |
| Text book  | Kernighan, Brian, and Dennis Ritchie. <i>The C Programming Language</i>   |  |                 |     |     |     |    |     |  |
| Other References   | 1. B.S. Gottfried - Programming With C - Schaum's Outline Series - Tata McGraw Hill 2nd Edition - 2004.<br>2. E. Balagurusamy - Programming in ANSI C - Second Edition - Tata McGraw Hill- 1999 |  |                 |     |     |     |    |     |  |

**PO and PSO mapping with level of strength for Course Name Programming for problem solving Lab (Course Code XXXX)**

|     | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO1 | PSO2 |
|-----|------|------|------|------|------|------|------|------|------|-------|------|------|
| CO1 | 1    | 3    | 2    | 2    | -    | -    | -    | -    |      | 1     | 2    | 3    |
| CO2 | 2    | 3    | 3    | 2    | 2    | -    | -    | -    |      | 1     | 2    | 3    |
| CO3 | 3    | 3    | 2    | 2    | 2    | -    | -    | -    | -    | 1     | 2    | 3    |
| CO4 | 3    | 3    | 2    | 2    | 2    | -    | -    | -    | -    | 1     | 2    | 3    |
| CO5 | 3    | 3    | 2    | 2    | 2    | -    | -    | -    | -    | 1     | 2    | 3    |
| CO6 | 3    | 3    | 3    | 2    | 2    | 2    | -    | 2    |      | 1     | 2    | 3    |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code | Course Name                         | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 |
|-------------|-------------------------------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| xxxx        | Problem solving using C Programming | 2.5  | 3    | 2.3  | 1.5  | 2.0  |      |      |      |      | 1     | 2.    | 3     |

**Strength of Correlation**

1. Addressed to Slight (Low=1) **extent**
2. Addressed to Moderate (Medium=2) **extent**
3. Addressed to Substantial (High=3) **extent**

|                   |                        |   |     |             |
|-------------------|------------------------|---|-----|-------------|
| <b>School:</b>    |                        | <b>School of Engineering and technology</b>   |     |             |
| <b>Department</b> |                        | <b>Department of Computer Science and Engineering</b>   |     |             |
| <b>Program:</b>   |                        | <b>Bachelor of Science</b>  |     |             |
| <b>Branch:</b>    |                        | <b>BSC</b>  |     |             |
| 1                 | Course Code            | <b>BOLXXX</b>   |     |             |
| 2                 | Course Title           | Object Oriented Programming Using Java and Web Designing Lab  |     |             |
| 3                 | Credits                | 2   |     |             |
| 4                 | Contact Hours (L-T-P)  | 0-0-4   |     |             |
|                   | Course Status          | Compulsory/Elective   |     |             |
| 5                 | Course Objective       | To implement Java language syntax and semantics and concepts such as classes, objects, inheritance, polymorphism, packages, multithreading and Web development through HTML, CSS, JavaScript etc.   |     |             |
| 6                 | Course Outcomes        | CO1: Installing, Writing and executing Java programs and Web Desig.<br>CO2: Understand and formulate the problems in basic programming constructs<br>CO3: Applying OOP and Web Design concepts to solve real world problems<br>CO4: Implement inheritance and polymorphism features of Java and HTML, CSS.<br>CO5: Implementing multithreading, XML and JavaScript<br>CO6: Develop Java and Web Program for application development |     |             |
| 7                 | Course Description     | Basic Object Oriented Programming (OOP) concepts including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are discussed. Web Designing is to give students the basic understanding of how things work in the Web world from the technology point of view as well as to give the basic overview of the different technologies.   |     |             |
| 8                 | Outline syllabus       |   |     | CO Mapping  |
|                   | <b>Unit 1</b>          | <b>Introduction</b>   |     |             |
|                   |                        | Installation, Configuration and basic programming.  |     | CO1         |
|                   | <b>Unit 2</b>          | <b>Introduction to Java with class and object</b>   |     |             |
|                   |                        | Programs on the concept of class and object   |     | CO2,CO3     |
|                   | <b>Unit 3</b>          | <b>Inheritance, Polymorphism &amp; Exception and Multithreading</b>   |     |             |
|                   |                        | Programs on the concept of Inheritance, Polymorphism & Exception and Multithreading   |     | CO2,CO3     |
|                   | <b>Unit 4</b>          | <b>HTML and CSS</b>   |     |             |
|                   |                        | Programs on the concept of HTML and CSS   |     | CO3,CO4,CO6 |
|                   | <b>Unit 5</b>          | <b>XML and JavaScript</b>   |     |             |
|                   |                        | Programs on the concept of XML and JavaScript   |     | CO3,CO5,CO6 |
|                   | Mode of examination    | Jury/Practical/Viva   |     |             |
|                   | Weightage Distribution | CA  | MTE | ETE         |
|                   |                        | 60%   | 0%  | 40%         |
|                   | Text book/s*           | 1.Schildt H, "The Complete Reference JAVA2", TMH<br>2. Douglas Comer "The Internet Book - Pearson Education", Asia  |     |             |
|                   | Other                  | 1. Balagurusamy E, "Programming in JAVA", TMH   |     |             |

|            |   |  |
|------------|---|--|
| References | 2. Professional Java Programming: BrettSpell, WROX Publication<br>Douglas E. Comer "Internetworking with TCP/IP", Volume-I, PHI |  |
|------------|---|--|

**PO and PSO mapping with level of strength for Course Name Introduction to Object Oriented Programming Using Java and Web Designing Lab (Course Code BOLXXX)**

| Course Code_<br>Course Name   | CO's | PO 1 | PO 2 | PO 3 | PO4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO2 | PSO3 |
|---|------|------|------|------|-----|------|------|------|------|------|-------|-------|-------|-------|------|------|
| <b>BOLXXX</b><br>Object Oriented Programming Using Java and Web Designing Lab | CO1  | 1    |      |      | 2   | 2    |      |      |      |      | 2     |       | 2     | 2     |      |      |
|   | CO2  | 2    |      |      | 2   | 2    |      |      |      |      | 2     |       |       | 2     |      |      |
|   | CO3  | 2    | 3    | 3    | 3   | 2    |      |      |      |      | 2     |       | 2     | 3     |      |      |
|   | CO4  | 3    |      |      | 3   | 2    |      |      |      |      | 2     |       |       | 2     | 2    |      |
|   | CO5  | 3    |      |      | 3   | 2    |      |      |      |      | 2     |       |       | 2     | 2    |      |
|   | CO6  | 3    | 3    | 3    | 3   | 2    |      |      |      |      | 2     |       | 3     | 3     | 2    |      |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code   | Course Name  | PO 1 | PO2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 |
|---------------|--|------|-----|------|------|------|------|------|------|------|-------|-------|-------|
| <b>BOLXXX</b> | Object Oriented Programming Using Java and Web Designing Lab | 2.5  | 3   | 3    | 2.5  | 3    | 0    | 0    | 0    | 0    | 2     | 2.5   | 2     |

**Strength of Correlation**

1. Addressed to *Slight (Low=1) extent*
2. Addressed to *Moderate (Medium=2) extent*
3. Addressed to *Substantial (High=3) extent*

|                   |                       |  |  |            |
|-------------------|-----------------------|--|--|------------|
| <b>School:</b>    |                       | <b>School of Engineering and technology</b>  |  |            |
| <b>Department</b> |                       | <b>Department of Computer Science and Engineering</b>  |  |            |
| <b>Program:</b>   |                       | <b>Bachelor Of Science</b>   |  |            |
| <b>Branch:</b>    |                       | <b>Computer Science</b>  |  |            |
| 1                 | Course Code           | BCO<br>XXX   |  |            |
| 2                 | Course Title          | Object Oriented Programming Using Java and Web Designing   |  |            |
| 3                 | Credits               | 4  |  |            |
| 4                 | Contact Hours (L-T-P) | 4-0-0  |  |            |
|                   | Course Status         | Core /Elective/Open Elective   |  |            |
| 5                 | Course Objective      | Understand the fundamentals of object-oriented concept in Java, defining classes, objects, invoking methods inheritance, interfaces and exception handling mechanisms. To develop skills in analyzing the usability of a web and understand fundamentals of tools and technology of web design.  |  |            |
| 6                 | Course Outcomes       | CO1: <b>Describe</b> the fundamental of object-oriented concept in java and web design.<br>CO2: <b>Compare</b> and contrast different features of java and web design.<br>CO3: <b>Develop</b> programs using core concepts of java and web development tools .<br>CO4: <b>Analyze</b> Exception and Error in java programs and security in web design<br>CO5: <b>Explain</b> the concept of inheritance, polymorphism and interfaces and web applications.<br>CO6: <b>Design</b> application of real-world problem using Java and web development tools. |  |            |
| 7                 | Course Description    | Basic Object-Oriented Programming (OOP) concepts, including objects, classes, methods, parameter passing, information hiding, inheritance and polymorphism are introduced and their implementations using Java are discussed.  |  |            |
| 8                 | Outline syllabus      |  |  | CO Mapping |
|                   | <b>Unit 1</b>         | <b>Introduction to Object Oriented Paradigm</b>  |  |            |
|                   | A                     | Procedural Languages, object-based languages, object-oriented languages, difference between programming paradigms, advantages of OOPs.   |  | CO1, CO2   |
|                   | B                     | Object oriented programming features: Abstraction, class, object, Encapsulation, data hiding, polymorphism, inheritance.   |  | CO2        |
|                   | C                     | Java virtual machine, Byte Code, Architecture of JVM, Class Loader, Execution Engine, Garbage collection.  |  | CO2        |
|                   | <b>Unit 2</b>         | <b>Introduction to Java with class and object</b>  |  |            |
|                   | A                     | Java development Kit (JDK), Introduction to IDE for java development, setting java environment (steps for path and CLASSPATH setting)  |  | CO2        |
|                   | B                     | Constants, Variables, Data Types, Operators, Expressions, Decision Making, Branching, Loops, command line argument   |  | CO2        |



|  |                        |  |               |     |
|--|------------------------|--|---------------|-----|
|  | C                      | Arrays, Type conversion & casting, Input from keyboard, Classes, Objects, Methods, Method overloading, Constructors, Constructor's overloading, static keyword, Introducing Access Control, String handling  | CO1, CO2, CO3 |     |
|  | <b>Unit 3</b>          | <b>Inheritance, Polymorphism &amp; Exception and Multithreading</b>  |               |     |
|  | A                      | Types of inheritance, Implementing Interface, Concept of multiple inheritances, use of this and super, Polymorphism, Overriding methods  | CO5           |     |
|  | B                      | Final class, method and variable, Abstract class and method, Introduction to Exception Handling, Introduction to try, catch, throw and throws.   | CO4, CO5, CO6 |     |
|  | C                      | Checked and Unchecked exceptions, User define exception, Introduction to Multithreading: multithreading advantages and issues, creating thread using Runnable interface and Thread class, Thread life cycle.   | CO4, CO5, CO6 |     |
|  | <b>Unit 4</b>          | <b>Web Design and Architecture</b>   |               |     |
|  | A                      | Introduction to Web: History of Internet, WWW, Client or Browser, website, internet browsers, Hypertext, Web server, Locating resource on internet-URI, URL, URN, ISP, Gateways.   | CO1, CO2      |     |
|  | B                      | Basic features of HTTP, Working of HTTP, HTTP response code, social networks, search engines, Video Conferencing, e-Commerce, m-Commerce. Web Architecture: Server, Type of server, database server, mail server, web server                           | CO1, CO2, CO3 |     |
|  | C                      | Components of web, usage of Web, client-server architecture, Domain Name System, Type of DNS servers, Example of DNS query and response, Wildcards, Negative response caching, Zone maintenance and transfers  | CO1, CO2      |     |
|  | <b>Unit 5</b>          | <b>Web Applications and security</b>   |               |     |
|  | A                      | SMTP-components, working of SMTP, SMTP protocol stack, SMTP headers, SMTP forwarding, SMTP relays, interoperation, how SMTP uses DNS, Concept of remote login, remote Login methods, setting environment for putty, login to remote system using putty | CO4, CO5, CO6 |     |
|  | B                      | FTP: FTP protocol, Usage of FTP, anonymous ftp, Setting FileZilla server and client, FTP commands: Access control commands, Transfer Parameter Commands, FTP Service Commands, FTP command arguments   | CO4, CO5, CO6 |     |
|  | C                      | Security requirements, confidentiality, authenticity, integrity, plain text, cipher text, Symmetric Cryptography, Asymmetric Cryptography,   | CO4, CO5, CO6 |     |
|  | Mode of examination    | Theory/Jury/Practical/Viva   |               |     |
|  | Weightage Distribution | CA   | MTE           | ETE |
|  |                        | 30%  | 20%           | 50% |

|                  |   |  |
|------------------|---|--|
| Text book/s*     | 1.Schildt H, “The Complete Reference JAVA2”, TMH<br>2. Douglas Comer “The Internet Book - Pearson Education”, Asia  |  |
| Other References | 3. Balagurusamy E, “Programming in JAVA”, TMH<br>4. Professional Java Programming: BrettSpell, WROX Publication<br>5. Douglas E. Comer “Internetworking with TCP/IP”, Volume-I, PHI |  |

### CO and PO Mapping

| S. No. | Course Outcome   | Program Outcomes (PO) & Program Specific Outcomes (PSO) |
|--------|--|---|
| 1.     | CO1: Describe the fundamental of object oriented concept in java and web design.           | PO3, PO10   |
| 2.     | CO2: Compare and contrast different features of java and web design.                       | PO3,PO10  |
| 3.     | CO3: Develop programs using core concepts of java and web development tools .              | P01,PO2,PO3,PO4,PO10                                    |
| 4.     | CO4: Analyze Exception and Error in java programs and security in web design               | PO3,PO10  |
| 5.     | CO5: Explain the concept of inheritance, polymorphism and interfaces and web applications. | PO3,PO10  |
| 6.     | CO6: Design application of real world problem using Java and web development tools.        | PO1,PO2,PO3,PO4,PO5,PO6,PO8, PO10,PSO1,PSO2             |

### PO and PSO mapping with level of strength for Course Name Object Oriented Programming Using Java and Web Designing (Course Code BCO-XXX)

| Course Code_ Course Name  | CO's | PO 1 | PO 2 | PO 3 | PO4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO2 |
|---|------|------|------|------|-----|------|------|------|------|------|-------|-------|------|
| Object Oriented Programming Using Java and Web Designing<br>BCO-XXX | CO1  |      |      | 2    |     |      |      |      |      |      | 2     |       |      |
|   | CO2  |      |      | 2    |     |      |      |      |      |      | 2     |       |      |
|   | CO3  | 2    | 3    | 2    | 2   |      |      |      |      |      | 2     |       |      |
|   | CO4  |      |      | 2    |     |      |      |      |      |      | 2     |       |      |
|   | CO5  |      |      | 2    |     |      |      |      |      |      | 2     | 2     | 1    |
|   | CO6  | 2    | 3    | 2    | 3   | 3    | 2    |      | 3    |      | 2     | 2     | 2    |

*Average of non-zeros entry in following table (should be auto calculated).*

| Course Code | Course Name  | PO 1 | PO2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PSO 1 | PSO 2 |
|-------------|--|------|-----|------|------|------|------|------|------|------|-------|-------|-------|
| BCO XXX     | Object Oriented Programming Using Java and Web Designing BCO-XXX | 2    | 3   | 2    | 2.5  | 3    | 2    | 0    | 3    | 0    | 2     | 2     | 1.5   |