# Detailed Program

# Bachelor of Technology (B.Tech.)

# (Computer Science Engineering)

## Semester-III

## (2023-27)

DOC202407270002

RNB GLOBAL UNIVERSITY

Educating stars for tomorrow

**RNB GLOBAL UNIVERSITY**

RNB Global City, Ganganagar Road,

Bikaner, Rajasthan 334601

## OVERVIEW

RNB Global University follows Semester System. Accordingly, each academic year is divided into two semesters, **Odd (July-December) and Even (January-June).** Besides this, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The curriculum for B. Tech (CSE) Program along with examination pattern is as follows:

### Course Scheme

### Semester – III

| S. No. | Course Code | Course Title | L | T | P | Credits |
|---|---|---|---|---|---|---|
| 1. | 19002600 | Applied Mathematics-III | 3 | 1 | 0 | 4 |
| 2. | 19003700 | Computer System Architecture | 3 | 0 | 0 | 3 |
| 3. | 19003500 | Data Structures | 3 | 0 | 0 | 3 |
| 4. | 19003600 | Data Structures Lab | 0 | 0 | 2 | 1 |
| 5. | 19008600 | Object Oriented Programming with C/C++ | 3 | 1 | 0 | 4 |
| 6. | 19008700 | Object Oriented Programming with C/C++ Lab | 0 | 0 | 2 | 1 |
| 7. | 19003800 | Operating Systems | 3 | 0 | 0 | 3 |
| 8. | 19003900 | Operating Functions Lab | 0 | 0 | 2 | 1 |
| 9. | 19004000 | Digital Electronic Circuits | 3 | 0 | 0 | 3 |
| 10. | 19004100 | Digital Electronic Circuits Lab | 0 | 0 | 2 | 1 |
| 11. | 11012200 | Human Values, Business & Managerial Ethics | 2 | 0 | 0 | 2 |
| 12. | 19004200 | Ability and Skill Enhancement -III | 2 | 0 | 0 | 2 |
| 13. | 99003300 | Workshops & Seminars /Human Values/SocialService/NCC/NSS | - | - | - | 1 |
| **Total** | | | **22** | **2** | **8** | **29** |

## EVALUATION SCHEME- THEORY

The evaluation of the theory paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

### Internal Assessment

The distribution of Internal Assessment Marks is as follows:

| Type | Details | Marks |
|---|---|---|
| Mid Term | Two Mid-term Sessional of 15 marks each (15+15) | 30 |
| Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc. | Average of marks obtained | 15 |
| Attendance | 75%+ : 5 marks | 5 |
| **TOTAL** | **50** | |

### External Assessment

| Type | Marks |
|---|---|
| Theory | 50 |

## EVALUATION SCHEME -PRACTICAL

The evaluation of the practical paper of B.Tech would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

**Internal Assessment**

| Type | Details | Marks |
|---|---|---|
| Marks obtained in various manuals, practical file, participation, any model prepared, output of practical | Average of marks obtained | 45 |
| Attendance | 75%+ : 5 marks | 5 |
| **TOTAL** | **50** | |

**External Assessment**

| Type | Marks |
|---|---|
| Practical | 50 |

## EVALUATION SCHEME- WORKSHOPS & SEMINARS & NCC/NSS

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluated internally by the institute. The credit for this will be given at the end of each Semester.

2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of each Semester.

# Bachelor of Technology – CSE (Four Years Course)

## 1. Vision

To deliver a high-quality education that will produce engineers of the highest caliber, equipped with the newest information and cutting-edge concepts in computer science engineering to fulfil the demands of industry and society.

## 2. Mission

1. To create an academic setting for the growth of professionals equipped with the knowledge, abilities, values, and self-assurance to assume leadership positions in the field of computer science and engineering.
2. To promote a culture of research that produces knowledge and cutting-edge technologies that aid in the society's sustainable development.
3. To improve academic collaborations for international exposure.

## 3 PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

**PEO1:** To produce studentswith strong foundation of knowledge and skills in the field of computer science and engineering.
**PEO2:** To produce students who are employable in private/public sector/research organizations or work as an entrepreneur.
**PEO3:** To produce students who can provide solutions to problems in their profession by applying computer engineering theory and practices.
**PEO4:** To produce graduates who can provide leadership and are effective in multidisciplinary environment.

## 4 PROGRAMME OUTCOMES (POs)

### Engineering Graduates will be able to:

**PO1:** Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2:** Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

**PO3:** Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4:** Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5:** Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitation.

**PO6:** The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7:** Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8:** Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9:** Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10:** Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11:** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12:** Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## 5. PROGRAMME SPECIFIC OUTCOMES (PSOs)

**PSO1:** The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics and networking for efficient design of computer-based systems of varying complexity.

**PSO2:** The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur and a zest for higher studies/employability in the field of Computer Science & Engineering.

**PSO3:** Cultivate the field of computing and its latest trends, to pursue teaching, research & development activities and to work effectively in a team.

| 6. Semester – III | | |
|---|---|---|
| **Course Code and Name** | **Course Outcomes: - After completion of these courses' students should be able to** | |
| 19002600-Applied Mathematics-III | **CO1:** | Demonstrate the statistical hypotheses tests. |
| | **CO2:** | Make use of probability theory on discrete and continuous random variables to obtainthe solution of problems on different distributions and joint probability distribution. |
| | **CO3:** | Identify the problems on statistical parameter estimation. |
| | **CO4:** | Classify the regression and correlation analysis. |
| | **CO5:** | Create a solution of a problem by using probability theory. |
| 19003700-Computer System Architecture | **CO1:** | Define the basic functions of a digital computer. |
| | **CO2:** | Illustrate the basic arithmetic and logic operations in the computer. |
| | **CO3:** | Explain memory organization. |
| | **CO4:** | Identify the I/O interfacing. |
| | **CO5:** | Ability to analyze memory hierarchy and its impact on computer Cost/performance. |
| 19003500-Data Structures | **CO1:** | Find the time complexity of algorithms. |
| | **CO2:** | Demonstrate the stacks and queues for various applications. |
| | **CO3:** | Experiment with tree data structure for different applications. |
| | **CO4:** | Apply the concepts of graph for computing shortest path and construct MST. |
| | **CO5:** | Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees. |
| 19003600-Data Structures Lab | **CO1:** | Find solutions for a range of problems using objects and classes. |
| | **CO2:** | Demonstrate the implementation of constructors, destructors and operator overloading. |
| | **CO3:** | Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism. |
| | **CO4:** | Solve the programs using generic programming, exception handling, templates, file Handling. |
| | **CO5:** | Able to identify and use a suitable data structure and algorithm to solve a real world problem. |
| 19008600-Object Oriented Programming with C/C++ | **CO1:** | Explain the object-oriented programming features in C++. |
| | **CO2:** | Apply these features to program design and implementation. |
| | **CO3:** | Develop applications using Object Oriented Programming Concepts. |

| | | |
|---|---|---|
| | **CO4:** | Design features of objectoriented programming to solve real world problems. |
| | **CO5:** | Handle exceptions in programming |
| 19008700-Object Oriented Programming with C/C++ Lab | **CO1:** | Explain the language environment. |
| | **CO2:** | Apply object-oriented concepts to solve problems. |
| | **CO3:** | Develop applications using object-oriented concepts. |
| | **CO4:** | Design features of object-oriented programming to solve real world problems. |
| | **CO5:** | Solve different type of problems using object-oriented programming Techniques |
| 19003800-Operating Systems | **CO1:** | Explain the role and responsibilities of OS in the computer system. |
| | **CO2:** | Illustrate how the OS deals with process management, memory management and secondary storage management. |
| | **CO3:** | Analyze process synchronization and deadlocks. |
| | **CO4:** | Apply the knowledge about OS, for the Linux operating system case study. |
| | **CO5:** | Able to analyze sharing of resources among multiple processes in order to detect, prevent and avoid a deadlock |
| 19003900-Operating Functions Lab | **CO1:** | Define the principles of resource management [Processor, Memory]. |
| | **CO2:** | Explain use operating systems with an understanding of professional, ethical and social issues. [Windows, Linux etc.,]. |
| | **CO3:** | Identify the lifelong need and engage in upgradation of operating system |
| | **CO4:** | Make use of shell commends and execute. |
| | **CO5:** | Create a program to analyze sharing of resources among multiple processes in order to detect, prevent and avoid a deadlock |
| 19004000-Digital Electronic Circuits | **CO1:** | Define the fundamental concepts and techniques used in digital electronics. |
| | **CO2:** | Show the ability to understand, analyze and design various combinational and sequential circuits. |
| | **CO3:** | Plan for basic requirements of a design application and propose a cost-effective solution. |
| | **CO4:** | Analyseand prevent various hazards and timing problems in a digital design. |
| | **CO5:** | Design the logic gates using different Logic families. |
| 19004100-Digital Electronic Circuits Lab | **CO1:** | Illustrate linear and digital electronic circuits. |
| | **CO2:** | Apply computing platform and software for engineering problems. |
| | **CO3:** | Design and implement interfacing. |

| | | |
|---|---|---|
| | **CO4:** | Develop projects using microprocessor |
| | **CO5:** | Realize the logic gates using different Logic families and verify the functionality. |
| 11012200-Human Values, Business & Managerial Ethics | **CO1:** | Explain the sustained happiness through identifying the essentials of human values and skills. |
| | **CO2:** | Compare profession and happiness. |
| | **CO3:** | Understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature. |
| | **CO4:** | Ability to develop appropriate technologies and management patterns to create harmony in professional and personal life. |
| | **CO5:** | Support the employer organization with valuable inputs on corporate governance. |
| 19004200-Ability and Skill Enhancement –III | **CO1:** | Classify the different types of reviews i.e. book review, movie review etc. |
| | **CO2:** | Express his/ her feeling at pressor situation or emotional situation |
| | **CO3:** | Explain his/her thoughts in group discussion and also build leadership quality |
| | **CO4:** | Enhance creativity in making documentary etc. |
| | **CO5:** | Manage negative emotions keeping balance of mental stability, stress and distress. |

## 7 Co PO Mapping

| 19002600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | - | 3 | 2 | 3 | 2 | 2 | 2 | - | - | 2 | 3 |
| CO2 | 3 | 2 | 2 | - | 3 | 3 | - | - | - | - | - | 3 |
| CO3 | - | - | 2 | - | 2 | 2 | - | - | 2 | - | - | 3 |
| CO4 | 2 | 2 | 2 | 2 | - | 3 | - | - | 2 | - | - | 3 |
| CO5 | 3 | 3 | 3 | 3 | - | 2 | 2 | 2 | 3 | 3 | 3 | 2 |

| 19003700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | - | 3 | 3 | 3 | 3 | 3 | 2 | 3 |
| CO2 | 2 | 3 | 3 | 2 | - | 2 | 2 | 3 | 3 | 2 | - | 3 |
| CO3 | 2 | 2 | 2 | 2 | 3 | - | - | - | 2 | 3 | 3 | 3 |
| CO4 | 2 | 3 | 3 | 2 | 3 | - | - | - | 3 | 3 | 3 | 3 |
| CO5 | - | - | - | 3 | 3 | 3 | 2 | 2 | - | - | 2 | - |

| 19003500 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | - | 2 | - | 3 | - | - | 3 | 2 | - | 3 |
| CO2 | 3 | 2 | 2 | 3 | - | 3 | - | - | - | 2 | - | 3 |
| CO3 | 2 | 2 | - | 3 | 2 | - | - | - | 2 | - | 2 | 3 |
| CO4 | - | 2 | - | 2 | - | 3 | - | - | 3 | 2 | - | 3 |
| CO5 | 3 | - | 3 | - | 3 | - | 3 | 3 | 2 | - | 2 | - |

| 19003600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | - | 2 | - | 2 | - | - | 2 | 2 | | 3 |
| CO2 | 2 | 3 | 3 | - | 2 | | - | 2 | | 2 | 3 | 3 |
| CO3 | 2 | - | - | - | - | 2 | - | - | 3 | 3 | - | 3 |
| CO4 | 2 | 2 | - | 2 | - | 3 | - | - | 3 | 2 | - | 3 |
| CO5 | 3 | 3 | 2 | - | 3 | - | 3 | 3 | - | - | 3 | - |

| 19008600 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | - | 2 | 2 | 3 | 3 | - | 3 | - | 2 | - | 3 |
| CO2 | 2 | 2 | 2 | - | 3 | 2 | - | 2 | - | 2 | 3 | 3 |
| CO3 | 2 | 2 | 3 | 2 | 2 | 3 | - | 2 | 2 | 2 | 2 | 3 |
| CO4 | 2 | - | 2 | - | 2 | - | - | 2 | - | 3 | 3 | 3 |
| CO5 | - | 3 | - | 3 | - | 2 | 3 | - | 3 | - | 2 | 2 |

| 19008700 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | - | 2 | - | 2 | - | 2 | 2 | - | 2 | 3 |
| CO2 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | | 2 | 3 | 3 | 3 |
| CO3 | 2 | - | 2 | 2 | - | 3 | 2 | 2 | 3 | 2 | 2 | 3 |
| CO4 | - | 2 | 2 | 2 | 2 | 2 | - | - | 2 | - | 2 | 3 |
| CO5 | 2 | - | 3 | - | 3 | - | 3 | 3 | - | 2 | 2 | - |

| 19003800 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | - | 2 | 2 | 3 |
| CO2 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | - | 3 | 3 |
| CO3 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 3 |
| CO4 | 2 | | 2 | 2 | | 3 | - | 2 | 3 | 3 | 3 | 3 |
| CO5 | - | 3 | - | - | 2 | - | 3 | 3 | 2 | - | 2 | 2 |

| 19003900 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | - | 2 | 2 | 3 |
| CO2 | 3 | - | 3 | 2 | 2 | 3 | 3 | 3 | 2 | - | 3 | 3 |
| CO3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 3 |
| CO4 | 2 | - | 2 | 2 | - | 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| CO5 | - | 3 | - | - | 2 | - | - | - | 3 | 3 | 2 | 2 |

| 19004000 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | - | 2 | 3 | 2 | 2 | 2 | - | 2 | 2 | 3 |
| CO2 | 3 | - | 3 | 2 | 2 | 3 | 2 | 3 | - | - | 3 | 3 |
| CO3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | - | 2 | 2 | 3 |
| CO4 | 3 | - | 2 | - | - | 3 | 2 | 2 | - | - | 3 | 3 |
| CO5 | 2 | 3 | - | 2 | 2 | - | - | - | 3 | 3 | - | - |

| 19004100 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 3 | 2 | 2 | - | - | - | - | 3 | 2 | - | 3 |
| CO2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | - | 2 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| CO4 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| CO5 | - | 2 | - | 2 | 2 | 3 | 2 | 3 | 2 | - | 3 | 3 |

| 11012200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | 2 | - | 3 | 2 | - | - | 3 | 3 | 3 | 3 | 3 |
| CO2 | - | 3 | - | - | 3 | 3 | 3 | - | 3 | - | - | 3 |
| CO3 | 3 | - | 2 | 3 | - | 2 | - | 3 | - | - | 3 | 3 |
| CO4 | 3 | 2 | 3 | - | 3 | 3 | 3 | - | 3 | 3 | - | 3 |
| CO5 | - | 3 | 3 | 2 | 2 | 3 | - | 3 | 3 | 2 | 3 | 3 |

| 19004200 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 3 | 3 | - | 3 | - | 2 | 2 | 3 | 3 | 2 |
| CO2 | 2 | 2 | 3 | 3 | - | 2 | - | 2 | - | 3 | 2 | 2 |
| CO3 | 2 | - | - | - | 3 | 2 | - | 3 | 2 | 3 | 2 | 2 |
| CO4 | 2 | - | 2 | - | 2 | - | - | 2 | - | 3 | - | 2 |
| CO5 | 3 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 2 |

**8.Curriculum**

# Course Name: Applied Mathematics-III
# Course Code: 19002600

**Objectives:**

- Students will be able to apply methods of mathematical modeling and problem solving to a variety of applied topics, including computational and analytical methods. Students will be able to demonstrate a general knowledge of mathematics beyond the undergraduate level. Students will be able to communicate mathematics effectively in written and oral form.

**Course Outline**

**Unit I: Fourier series and Fourier Transforms**

Euler's formulas, conditions for a Fourier expansion, change of interval, Fourier expansion ofodd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series. Fourier integrals, Fouriertransforms, Shifting theorem, Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

**Unit II: Functions of Complex Variable**

Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions, Limit and Continuity of a function, Differentiability and Analyticity of function. Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic,polar form of the Cauchy-Riemann equations, Harmonic functions, application to flow problems, Integration of complex functions, Cauchy-Integral theorem and formula.

**Unit III: Power series**

Radius and circle of convergence, Taylor's, Maclaurin's and Laurent's series. Zeroes and singularities of complex functions, Residues Evaluation of real integrals using residues (around unit and semi-circle only); Linear Programming: Linear programming problems formulation, solving linear Programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

**Unit IV: Probability Distributions and Hypothesis Testing**
Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions,
Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (Applications only), Chi-square test of goodness of fit.

**Suggested Readings**


1. Advanced Engg. Mathematics: F Kreyszig.
2. Higher Engg. Mathematics: B.S. Grewal.
3. Engineering Mathematics by Babu Ram Pearson media Publication
4. Advance Engg. Mathematics: R.K. Jain, S.R.K.Iyenger.
5. Advanced Engg. Mathematics: Michael D. Greenberg.


## Course Name: Computer System Architecture
## Course Code:19003700

**Objectives**

- To equip the students with the internal architecture, organization and design of computer systems
- To understand the basic structure and operation of digital computer
- To study the design of arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations
- To study the two types of control unit techniques and the concept of pipelining
- To study the hierarchical memory system including cache memories and virtual memory To study the different ways of communicating with I/O devices and standard I/O interfaces

**Course Outline:**

**Unit I: Basics of Digital Electronics**
Codes, Logic gates, Flip flops, Registers, Counters, Multiplexer, Demultiplexer, Decoder, Encoder. **Register Transfer and Micro operations:** Register transfer Language, Register transfer, Bus & memory transfer, Logic micro operations, Shift micro operation. **Basic Computer Organization:** Instruction codes, Computer instructions, Timing & control, Instruction Cycles, Memory reference instruction, Input/Output & Interrupts, Complete computer description & design of basic computer.

**Unit II: : Control Unit**
Hardwired vs. Micro programmed control unit. Central Processing Unit: General register

organization, Stack organization, Instruction format, Data transfer & manipulation, Program control, RISC, CISC.
**Computer Arithmetic**: Addition&subtraction,MultiplicationAlgorithms, Division algorithms

**Unit III: Input-Output Organization**
Peripheral devices, I/O interface, Data transfer schemes, Program control, Interrupt, DMA transfer, I/O processor.
**Memory Unit:** Memory hierarchy, Processor vs. memory speed, High-speed memories, Cache memory, Associative memory, Interleave, Virtual memory, Memory management.

**Unit IV: Introduction To Parallel Processing**
Pipelining, Characteristics of multiprocessors, Interconnection structures, Interprocessor arbitration, Interprocessor communication & synchronization.

**Suggested Readings:**


1. Mano, Morris M., Computer System Architecture, Prentice Hall (1992) 3rd ed.
2. Hayes, J.P., Computer Architecture and Organization, McGraw Hill (1998) 3rd ed.
3. Hennessy, J.L., Patterson, D.A, and Goldberg, D., Computer Architecture A Quantitative Approach, Pearson Education Asia (2006) 4th ed.
4. Leigh, W.E. and Ali, D.L., System Architecture: software and hardware concepts, South Wester Publishing Co. (2000).


## Course Name: Data Structure

## Course Code: 19003500

**Objectives**

- To give a complete overview about the various data structures used in computer science and to explain the implementation of these data structures in C programming.

**Course Outline:**

**Unit I: Introduction**
Algorithm complexity and Big O notation, Recursion and its importance, Tower of Hanoi problem. **Stacks:** Concept, Operations and representation, Application to evaluation of postfix expressions, Conversion from infix to postfix representation.

**Unit II: Queues**
Sequential representation, Operations, Priority queues, and Array implementation. **Linked Lists:** Concept, Operations, Stacks and queues as lists, Array and dynamic representation Circular lists, Doubly linked lists, Josephus problem.

**Unit III: Trees**
Definition, Array and dynamic representations, Operations, Lists as trees, Almost Complete binary trees, threaded binary trees, AVL trees, heaps;
**Graphs**: Applications of graphs.
**Sorting:** Efficiency considerations, O notation, Bubble sort, Quicksort, Selection sort, Binary Tree sort heap, Heapsort, Heap as a priority queue, Insertion sort, Shell sort, Merge sort, Radix sort.

**Unit IV: Searching**
Sequential searching, Indexed sequential searching, Binary search, Interpolation search, Binary tree searching, Insertion and deletion, Optimum search trees, Height balanced trees, Single and double rotations, Multi way, Search trees, B-trees, B+-trees, Hashing methods of resolving clashes, Methods of choosing Hash functions.

**Suggested Readings**


1. Kruse, R.L., Leung, B.P. and Tondo, C.L., Data Structures and Program Design in C, Dorling Kindersley (2008).
2. Langsam, Y. and Augenstein, M.J., Data Structures Using C and C++, Dorling Kindersley (2008) 2nd ed.
3. Trembley, J.P., Sorenson, P.G., An introduction to data structures with applications, Tata McGraw Hill (2008) 2nd ed.
4. Sahni, Sartaj, Data Structures, Algorithms and Applications in C++, Universities Press (2005) 2nd ed.

## Course Name: Data Structure Lab

## Course Code: 19003600

**Course Outline**

**Laboratory work:** Implementation of Arrays, Recursion, Stacks, Queues, Lists, Binary trees, sorting techniques, Searching techniques in C/C++.

## Course Name: Object Oriented Programming with C/C++

## Course Code: 19008600

**Objectives**

- To provide an overview of the various business process, analyze operations, production planning.

**Course Outline:**

**Unit I: Review**
Review of basic concepts of object-oriented programming, Comparison between procedural programming paradigm and object-oriented programming paradigm. Classes and Objects: Specifying a class, Creating class objects, Accessing class members, Access specifiers – public, private, and protected, Classes, Objects and memory, Static members, Theconst keyword and classes, Static objects, Friends of a class, Empty classes, Nested classes, Local classes, Abstract classes, Container classes, Bit fields and classes.

**Unit II: Console Based I/O**
Concept of streams, Hierarchy of console stream classes, Input/output using Overloaded operators >> and << and Member functions of I/O stream classes, Formatting Output, Formatting using ios class functions and flags, Formatting using manipulators. Constructors and Destructors: Need for constructors and destructors, Copy constructor, Dynamic constructors, Destructors.

**Unit III: "for", "while" and "do – while" loops**
Break and continue statement, nested control statement, value returning functions, void functions, value versus reference Parameters, local and global variables, static and automatic variables, enumeration type, one dimensional array, two dimensional array, character array, pointer data and pointer variables.

**Unit IV*:* Object Oriented Concepts**

Abstraction, encapsulation, inheritance and its types, static and dynamic binding, overloading. Program Development: Object oriented analysis, design, unit testing & debugging, system testing & integration, maintenance.

**Virtual Functions and Polymorphism:** Concept of Binding - Early binding andlate binding, Virtual functions, Pure virtual functions, Abstract classes, Virtual destructors & polymorphism.

**Suggested Readings:**


1. Lippman, S.B. and Lajoie, J., C++Primer, Pearson Education (2005) 4th ed.
2. Stroustrup, Bjarne, The C++ Programming Language, Pearson Education (2000)3rd ed.
3. Eills, Margaret A. and Stroustrup ,Bjarne, The Annonated C++ Reference Manual, Pearson Education (2002).
4. Rumbaugh, J.R., Premerlani, W. and Blaha, M., Object Oriented Modeling and Design with UML, Pearson Education (2005) 2nd ed.
5. Kanetkar, Yashvant, Let us C++, Jones and Bartlett Publications (2008) 8th ed


## Course Name: Object Oriented Programming with C/C++ Lab

## Course Code: 19008600

**Outline:**

**Programs:**

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series S = 1+1/2+1/3+1/4
4. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
5. WAP to compute the factors of a given number.
6. Write a program that swaps two numbers.
7. WAP to print a triangle of stars as follows (take number of lines from user):

```
    *
   ***
  *****
 *******
*********
```

8. WAP to perform following actions on an array entered by the user: i) Print theeven-valued elements ii) Print the odd-valued elements.
9. Calculate and print the sum and average of the elements of array
10. Print the maximum and minimum element of array
11. Write a program that swaps two numbers using pointers.
12. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
13. WAP to display Fibonacci series using recursion.
14. WAP to display Fibonacci series using iteration.
15. WAP to calculate Factorial of a number using iteration
16. WAP to calculate Factorial of a number using recursion
17. Create Matrix class using templates. Write a menu-driven program to perform following Matrix operations (2-D array implementation): a) Sum b) Difference
    a) Create a class Box containing length, breath and height. Include following methods init:Calculate surface Area
    b) Calculate Volume
18. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
19. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

## Course Name: Operating Systems

## Course Code: 19003800

**Objectives**

- The course will introduce standard tools and techniques for software development, using object oriented approach, use of a version control system, an automated build process, an appropriate framework for automated unit and integration tests.

**Course Outline:**

**Unit I: Introduction**

Definition and types of operating systems, Batch Systems, multi programming, time–sharing parallel, distributed and real-time systems, Operating system structure, Operating system components and services, System calls, system programs, Virtual machines.

**Unit II: Process Management**

Process concept, Process scheduling, Cooperating processes, Threads, Inter-process communication, CPU scheduling criteria, Scheduling algorithms, multiple processor

scheduling, Real-time scheduling and Algorithm evaluation. Process Synchronization and Deadlocks: The Critical-Section problem, synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, Monitors, Deadlocks-System model, Characterization, Deadlock prevention, Avoidance and Detection, Recovery from deadlock, Combined approach to deadlock handling.

**Unit III: Storage management**

Memory Management-Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation with paging, Virtual Memory, Demand paging and its performance, Page replacement algorithms, Allocation of frames, Thrashing, Page Size and other considerations, Demand segmentation, File systems, secondary Storage Structure

**Unit IV: File concept**

Access methods, directory implementation, Efficiency and performance, recovery, Disk structure, Disk scheduling methods, Disk management, Recovery, Swap-Space management, Disk reliability.

**Unit V: Protection**

Security-Goals of protection, Domain of protection, Access matrix, Implementation of access Matrix, Revocation of Access Rights, language based protection, The Security problem, Authentication, One Time passwords, Program threats, System threats, Threat Monitoring, Encryption.

**Suggested Readings**


1. W. Stalling, Data & Computer Communication, 8th edition, Prentice Hall of India, 2006.
2. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
3. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
4. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.

## Course Name: Operating Functions Lab

## Course Code: 19003900

**Course Outline:**

**List of Experiments**

1. Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify "cal" command to display calendars of the specified months.
6. Write a shell script to modify "cal" command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message – "Entered login name is invalid".
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of "who" command along with the total number of users
10. Write a shell script to display the multiplication table any number,
11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file. 12. Write a shell script to find the sum of digits of a given number.
12. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
13. Write a shell script to find the LCD(least common divisor) of two numbers.
14. Write a shell script to perform the tasks of basic calculator.
15. Write a shell script to find the power of a given number.
16. Write a shell script to find the factorial of a given number.
17. Write a shell script to check whether the number is Armstrong or not.
18. Write a shell script to check whether the file have all the permissions or not.

## Course Name: Digital Electronic Circuits

## Course Code: 19004000

**Objectives**

- The main objective of this course to make student familiar about basic component of any electronics devices. The basic of digital electronics circuit can be studied in this subject. The main component of computer covered in this subject. By the theoretical and practical knowledge we can verify the various aspects of digital electronic circuits. This file covered the all information regarding lecture, tutorials, webinar, seminar and many more things to cover.

**Course Outline:**

**Unit I: Number Systems**
Number systems, Conversions, Number Representations, Demorgans Theorem, Boolean Algebra and Arithmetic operations. Binary codes, Error detection and correction codes.Unit II: Combinational circuits
Simplification of Boolean functions by K-map method and Q. M. method, Half adder, Full adder, BCD adder, High speed adder, subtractor, multiplier, dividers, ALU, Code conversion, Magnitude comparators, Encoders, Decoders, Multiplexers, Demultiplexer, Application of Encoders, Decoders, MUX, DEMUX. Implementation using ROM, PLA, PAL, FPGAs & TTL ICs for their applications.

**Unit III: Sequential circuits**
Various types of flip-flops and their conversions. Registers, Timing issues, Counters-Synchronous, Asynchronous. Finite state machines. Design of Synchronous sequential circuits. Design of Asynchronous circuits, cycles, races and hazards.

**Unit IV: Memories Types of ROM**
RAM- Static and Dynamic, Representative circuits for cells using BJT and FETs, Timing diagrams of memories; Memory expansion using ICs, Flash memory, CCD, latest trends in memories;
**Logic circuits:** ECL, TTL, MOS, CMOS logic families their comparison. Detailed study of TTL, CMOS and their characteristics, fanout, unit load, current & voltage parameters. Tristate Logic. Interfacing of TTL & CMOS logic families

**Suggested Readings:**

1. Modern Digital Electronics- R. P. Jain, Tata McGraw Hill Pub. Company

2. Digital Fundamentals-Thomas L. Floyd, Universal Publishing House
3. Digital Electronics: An Introduction to Theory and Practice-William H. Gothmann, Prentice Hall of India
4. Digital Principles and Applications, A.P. Malvino, McGraw Hill International Editions

## Course Name: Digital Electronics Circuits Lab

## Course Code: 19004100

**Course Outline:**

**List of Experiments**

1. Introduction to Digital Laboratory Equipments& IC‟s
2. To study basic gates and verify their truth tables.
3. To design and construct basic flip-flops
4. To design and implement Binary to Gray
5. To design and implement Gray to Binary
6. To Design adder circuit.
7. To Design subtractor circuit.
8. To Design Bit Comparator circuit.
9. To design and construct of Synchronous Counter
10. To design and construct Asynchronous counter
11. To realize Basic gates (AND,OR,NOT) From Universal Gates( NAND & NOR).
12. To study about full adder & verify its truth table.

## Course Name: Human Values, Business and Managerial Ethics

## Course Code: 11012200

**Objectives:**

- To Know about the importance of ethics, Moral values in Human life, Business.-
- To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on the correct understanding of the Human reality and the rest of the Existence. Such a Holistic perspective forms the basis of value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

**Course Outline**

**Unit I: Values & Ethics**
Concept of Values and its formation; Values and Behavior. What is Ethics? Nature and scope of Ethics; Morality vs. Legality dilemma. Facts and value; Ethical subjectivism and Relativism, Moral Development (Kohlberg's 6 stages of Moral Development), Ethics and Business, Myth of a moral business.

**Unit II: Decision making (Normal Dilemmas and Problems)**
Application of Ethical theories in Business (i) **Utilitarianism** (J.Bentham and J.S. Mill), (ii) **Deontology** (I. Kant) (iii) **Virtue Ethics** (Aristotle).**Economic Justice: Distributive Justice**, John Rawls **Libertarian Justice** (Robest Nozick).

**Unit III: Corporate Social Responsibility of Business**
Concept of CSR; Changing expectation of society; Models of CSR: - Carroll's Model; Ackerman's Model. Why Social Responsibility of Business? Arguments in Favor and in against of Social Responsibility. **Consumerism and Consumer Rights.**

**Unit IV: Ethical Issues in Business: Marketing**
Characteristics of Free and Perfect competitive market, Monopoly oligopoly, Corruption and Bribery; Ethics in Advertising (Truth in Advertising).**Finance:** Fairness and Efficiency in Financial Market, Insider Trading, Greenmail, Golden parachute. **HR:** Workers Right and Duties: Work place safety, sexual harassment, whistles blowing.

**Unit V: Managerial Ethics** Ethical Decision Making. Role of Moral philosophy in decision making; Argument for and against of Ethics in Business. Challenge of ethical issues due to Globalization. Power and Politics in organization. Hierarchism as organizational values. Indian ethos in Management.

**Suggested Readings**


1. Business Ethics Text and Cases , C.S.V.Murthy, Himalaya Publishing House
2. Business Ethics, Francis & Mishra, TMH
3. Business Ethics, Fernando A. C. , Pearson
4. Values & Ethics, Kaur Tripat, Galgotia Publishers
5. Ethics in Management: A Vedantic Perspective; Chakraborty, S. K. Oxford University Press


## Course Name: Ability & Skill Enhancement III

## Course Code: 19004200

**Objectives:**

- Besides making English Learning an interesting activity, the curriculum aims to develop and enhance creativity of the students

**Course Outline - Final Assessment – Preparing a documentary**

**Unit I: Book & Movie Reviews**
What is Book Review, Purpose & Importance of Book Review, Types of Book Review,and Elements& Steps of Writing Book Review, What is Movie Review, Purpose & Importance of Movie Review, Types of Movie Review, and Elements& Steps of Writing Movie Review.

**Unit II: LSWR Skills**
Reading Comprehension, Rewriting Mythology/Folklore, Debate, News Analysis, Role Plays.

**Unit III: Emotional Intelligence& Handling Emotions**
What is emotional intelligence, E.Q. Tests, performing under pressure, how to take right decisions under pressure keeping balance in difficult emotional situations. The science of emotional intelligence, characteristics of emotional intelligence, Emotions handling-

identifying good and bad emotions, how to control emotions, how to manage negative emotions keeping balance of mental stability, stress and distress.

**Unit IV: Group Discussion Skills**
What is GD, Types of Group Discussions, Do's & Dont's, Participation, Thinking, Structuring, Group Behavior, Leadership Skills, Interpersonal Skills, Persuasive Skills, Conceptualization Skills.

**Unit V: Documentary Making**
What is documentary, aims & objectives, documentary for social cause, Documentary/Movie Screening & Reviews, preparing a documentary, Narration.

**Note:** The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

## 9. Lesson Plan: Semester – III

**19002600– Applied Mathematics-III**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Fourier Series and Fourier Transforms: Periodic Functions, Euler's formulas | C1 - C2 | Lecture |
| Unit I | Application of Fourier Series, Conditions for a Fourier expansion; Questions for obtaining the Fourier Series | C3 - C4 | Lecture |
| Unit I | Fourier expansion of odd and even functions, Change of interval | C5 - C6 | Lecture |
| Unit I | Fourier expansion of square wave, rectangular wave, saw-toothed wave | C7 - C8 | Lecture |
| Unit I | Half and full rectified wave, half range sine and cosine series | C9 - C10 | Lecture |
| Unit I | Fourier integrals | C9 - C11 | Lecture |
| Unit I | Fourier transforms, Shifting theorem | C12 - C13 | Lecture |
| Unit I | Fourier transforms of derivatives, Fourier transforms of integrals | C14- C15 | Lecture |
| Unit I | Convolution theorem, Fourier transform of Dirac-delta function. | C16 -C17 | Lecture |
| | Clarification Class -I | C18 | Clarification Class |
| | Classroom Assignment - I | C19 | Class Assignment |
| | Home Assignment - I | | Home Assignments |
| Unit II | Functions of Complex Variable: Definition, Exponential function | C20 - C21 | Lecture |
| Unit II | Trigonometric and Hyperbolic functions, Logarithmic functions | C22-C23 | Lecture |
| Unit II | Limit and Continuity of a function | C24-C25 | Lecture |
| Unit II | Differentiability and Analyticity of function. | C26-C27 | Lecture |
| Unit II | Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic | C28-C30 | Lecture |
| Unit II | Polar form of the Cauchy-Riemann equations | C31 | Lecture |
| Unit II | Harmonic functions, application to flow problems | C32-C33 | Lecture |
| Unit II | Integration of complex functions. Cauchy-Integral theorem and formula | C34-C35 | Lecture |
| | Clarification Class -II | C36 | Clarification Class |
| | Classroom Assignment - II | C37 | Class Assignment |
| | Home Assignment - II | | Home Assignments |
| Unit III | Power series, radius and circle of convergence | C38-C39 | Lecture |
| Unit III | Taylor's, Maclaurin's and Laurent's series | C40-C41 | Lecture |
| Unit III | Zeroes and singularities of complex functions | C42-C43 | Lecture |
| Unit III | Residues Evaluation of real integrals using residues (around unit and semi-circle only) | C44-C45 | Lecture |
| Unit III | Linear Programming: Linear programming problems formulation | C46-C47 | Lecture |

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|---|---|---|---|
| Unit III | Solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method. | C48-C52 | Lecture |
| | Clarification Class -III | C53 | Clarification Class |
| | Classroom Assignment - III | C54 | Class Assignment |
| | Home Assignment - III | | Home Assignments |
| Unit IV | Probability Distributions and Hypothesis Testing: Conditional probability | C55 | Lecture |
| Unit IV | Bayes theorem and its applications | C56 | Lecture |
| Unit IV | Expected value of a random variable | C57 | Lecture |
| Unit IV | Properties and application of Binomial, Poisson and Normal distributions | C58 | Lecture |
| Unit IV | Testing of a hypothesis | C59 | Lecture |
| Unit IV | Tests of significance for large samples, Student's t-distribution (Applications only), Chi-square test of goodness of fit | C60 | Lecture |
| | Clarification Class -IV | | Clarification Class |
| | Classroom Assignment - IV | | Class Assignment |
| | Home Assignment - IV | | Home Assignments |
| | PPT Presentation | | Presentation |
| | Webinar | | Webinar |
| | Revision | | Tutorial |

**19003700–Computer Architecture**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Basics of Digital Electronics | | |
| Unit I | Introduction to Codes, Logic gates, Flip flops, Registers, Counters | C1 | Lecture |
| Unit I | Multiplexer, Demultiplexer, Decoder, Encoder | C2 | Lecture |
| Unit I | Register Transfer and Micro operations: Register transfer Language | C3 | Lecture |
| Unit I | Register transfer, Bus & memory transfer | C4 | Lecture |
| Unit I | Logic micro operations, Shift micro operation | C5 | Lecture |
| | Activity | C6 | Activity |
| | Take Home Assignments | | Home Assignments |
| | Basic Computer Organization: Instruction codes, Computer instructions | C7 | Lecture |
| Unit II | Timing & control, Instruction Cycles | C8 | Lecture |
| Unit II | Memory reference instruction, Input/output & Interrupts | C9 | Lecture |
| Unit II | Complete computer description & design of basic computer | C10 | Lecture |
| Unit II | Clarification Class | C11 | Clarification Class |
| Unit II | Control Unit | | |
| Unit II | Hardwired vs. Micro programmed control unit. | C12 | Lecture |
| Unit II | Hardwired vs. Micro programmed control unit. | C13 | Lecture |
| Unit II | Central Processing Unit: General register organization | C14 | Lecture |
| Unit II | Stack organization | C15 | Lecture |
| Unit II | Instruction format | C16 | Lecture |
| Unit II | Data transfer & manipulation | C17 | Lecture |
| Unit II | Program control, RISC, CISC | C18 | Lecture |
| Unit II | Addition & subtraction, Multiplication Algorithms, Division algorithms | C19 | Lecture |
| Unit II | Webinar | C20 | Webinar |
| Unit II | Quiz | C21 | Quiz |
| Unit II | Class Room Assignment | C22 | Class Assignment |
| Unit II | Presentation | C23 | Presentation |
| | Take Home Assignments | | Home Assignments |
| | Seminar | C24 | Seminar |
| Unit II | Clarification Class | C25 | Clarification Class |
| Unit II | Guest Lecture | C26 | Guest lecture |
| | Input-Output Organization | | |
| | Peripheral devices, I/O interface | C27 | Lecture |
| Unit III | Data transfer schemes | C28 | Lecture |
| Unit III | Program control, Interrupt | C29 | Lecture |
| Unit III | DMA transfer, I/O processor | C30 | Lecture |
| Unit III | Memory hierarchy, Processor vs. memory speed | C31 | Lecture |
| Unit III | High-speed memories, Cache memory, Associative memory | C32 | Lecture |
| Unit III | Interleave, Virtual memory, Memory management | C33 | Lecture |

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| Unit III | Webinar | C34 | Webinar |
| | Presentation | C35 | Presentation |
| | Clarification Class | C36 | Clarification Class |
| | Class Room Assignment | C37 | Class Assignment |
| Unit IV | Take Home Assignments | | Home Assignments |
| Unit IV | Introduction To Parallel Processing | C38 | |
| Unit IV | Pipelining | C39 | Lecture |
| Unit IV | Characteristics of multiprocessors | C40 | Lecture |
| Unit IV | Interconnection structures | C41 | Lecture |
| Unit IV | Interprocessor arbitration | C42 | Lecture |
| Unit IV | Interprocessor communication & synchronization | C43 | Lecture |
| Unit IV | Class Room Assignment | C44 | Class Assignment |
| | Guest Lecture | C45 | Guest lecture |

**19003500– Data Structures**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Introduction to Data Structures | | |
| Unit I | Algorithm complexity and Big O notation | C1 | Lecture |
| Unit I | Recursion and its importance | C2 | Lecture |
| Unit I | Tower of Hanoi problem | C3 | Lecture |
| Unit I | Stacks: Concept, Operations and representation | C4 | Lecture |
| Unit I | Application to evaluation of postfix expressions | C5 | Lecture |
| Unit I | Conversion from infix to postfix representation | C6 | Lecture |
| | Clarification Class | C7 | Clarification Class |
| | Take Home Assignment 1 | | Home Assignments |
| Unit II | Queues & Linked Lists | | |
| Unit II | Queues: Sequential representation, Queue Operations | C8 | Lecture |
| Unit II | Priority queues, and Array implementation | C9 | Lecture |
| Unit II | Linked Lists: Concept, Operations | C10 | Lecture |
| Unit II | Stacks and queues as lists | C11 | Lecture |
| Unit II | Circular linked lists | C12 | Lecture |
| Unit II | Doubly linked lists, Josephus problem | C13 | Lecture |
| | Webinar | C14 | Webinar |
| Unit II | Array and dynamic representation Circular lists | C15 | Lecture |
| | Clarification Class | C16 | Clarification Class |
| | Class Room Assignment 1 | C17 | Class Assignment |
| | Activity | C18 | Activity |
| Unit III | Trees, Graphs & Sorting | | |
| Unit III | Trees: Definition, Array and dynamic representations, | C19 | Lecture |
| Unit III | Operations, Lists as trees, Almost Complete binary trees, Threaded binary trees | C20 | Lecture |
| | Seminar | C21 | Seminar |
| Unit III | AVL trees | C22 | Lecture |
| Unit III | AVL trees, Heaps | C23 | Lecture |
| Unit III | Graphs: Applications of graphs | C24 | Lecture |
| Unit III | Sorting: Efficiency considerations, O notation, Bubble sort, Quicksort | C25 | Lecture |
| | Class Room Assignment 2 | C26 | Class Room Assignment |
| Unit III | Selection sort, Binary Tree sort heap | C27 | Lecture |
| Unit III | Heapsort, Heap as a priority queue | C28 | Lecture |
| | Guest Lecture | C29 | Guest lecture |
| Unit III | Insertion sort, Merge sort | C30 | Lecture |
| Unit III | Shell sort, Radix sort | C31 | Lecture |
| | Presentation | C32 | Presentation |
| | Quiz | C33 | Quiz |
| Unit III | Clarification Class | C34 | Clarification Class |
| Unit III | Take Home Assignment | | Home Assignments |
| Unit IV | Searching: Sequential searching, Indexed sequential searching | C35 | Lecture |

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|---|---|---|---|
| | Webinar | C36 | Webinar |
| Unit IV | Binary search, Interpolation search | C37 | Lecture |
| Unit IV | Binary tree searching, Insertion and deletion, Optimum search trees | C38 | Lecture |
| Unit IV | Height balanced trees, Single and double rotations, Multi way, Search trees | C39 | Lecture |
| | Guest Lecture | C40 | Guest lecture |
| | Class Room Assignment | C41 | Class Assignment |
| Unit IV | B-trees, B+-trees | C42 | Lecture |
| Unit IV | Hashing methods of resolving clashes, | C43 | Lecture |
| Unit IV | Methods of choosing Hash functions | C44 | Lecture |
| | Clarification Class | C45 | Clarification Class |
| | Take Home Assignment | | Home Assignments |

**19003600– Data Structures Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Implementation of Single Dimension Array, Implementation of Multi Dimension Array | P1-P2 | Practical |
| 2 | Recursion, Stack Operations | P3-P4 | Practical |
| 3 | Stack Operations | P5-P6 | Practical |
| 4 | Queue Operations | P7-P8 | Practical |
| 5 | Linked List Implementation | P9-P10 | Practical |
| 6 | Linked List Implementation, Binary Trees | P11-12 | Practical |
| 7 | Binary Trees, Quick Sort | P13-P14 | Practical |
| 8 | Quick Sort | P15-P16 | Practical |
| 9 | Insertion Sort | P17-P18 | Practical |
| 10 | Merge Sort | P19-P20 | Practical |
| 11 | Merge Sort | P21-P22 | Practical |
| 12 | Linear Search | P23-P24 | Practical |
| 13 | Binary Search | P25-P26 | Practical |
| 14 | Clarification Class | P27-P28 | Clarification Class |
| 15 | Quiz | P29-P30 | Quiz |

**19008600– Object Oriented Programming with C/C++**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Basic concept of OOPS | C1 | Lecture |
| Unit I | Review of basic concepts of object-oriented programming | C2 | Lecture |
| Unit I | Comparison between procedural programming paradigm and object-oriented programming paradigm | C3 | Lecture |
| Unit I | Classes and Objects: Specifying a class | C4 | Lecture |
| Unit I | Creating class objects, Accessing class members | C5 | Lecture |
| Unit I | Access specifiers – public, private, and protected | C6 | Lecture |
| Unit I | Classes, Objects and memory | C7 | Lecture |
| Unit I | Static members, The const keyword and classes | C8 | Lecture |
| Unit I | Static objects, Friends of a class | C9 | Lecture |
| Unit I | Empty classes | C10 | Lecture |
| Unit I | Nested classes, Local classes | C11 | Lecture |
| Unit I | Abstract classes, Container classes, Bit fields | C12 | Lecture |
| Unit I | Presentation | C13 | Presentation |
| | Home Assignment | | Home Assignment |
| | Clarification Class | C14 | Clarification Class |
| | Class Room Assignment | C15 | Class Assignment |
| Unit II | Console Based I/O | | |
| Unit II | Concept of streams, Console Based I/O | C16 | Lecture |
| Unit II | Hierarchy of console stream classes, | C17 | Lecture |
| Unit II | Input/output using Overloaded operators >> and << and Member functions of I/O stream classes | C18 | Lecture |
| Unit II | Formatting Output | C19 | Lecture |
| Unit II | Formatting using ios class functions and flags | C20 | Lecture |
| Unit II | Formatting using manipulators | C21 | Lecture |
| Unit II | Constructors and Destructors: Need for constructors and destructors | C22 | Lecture |
| | Class Room Assignment | C23 | Class Assignment |
| Unit II | Copy constructor | C24 | Lecture |
| Unit II | Dynamic constructors | C25 | Lecture |
| Unit II | Destructors | C26 | Lecture |
| | Clarification Class 2 | C27 | Clarification Class |
| | Guest Lecture 1 | C28 | Guest lecture |
| | Home Assignment | C29 | Home Assignment |
| Unit III | Loops, Arrays & Pointers | C30 | Lecture |
| Unit III | "for", "while" and "do – while" loops, break and continue statement | C31 | Lecture |
| | Home Assignment | | Home Assignments |
| | Seminar | | Seminar |
| Unit IV | nested control statement, value returning functions | C32 | Lecture |
| Unit IV | void functions, value versus reference Parameters | C33 | Lecture |
| Unit IV | local and global variables, static and automatic variables | C34 | Lecture |
| | Seminar | C35 | Seminar |
| Unit IV | enumeration type | C36 | Lecture |

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|---|---|---|---|
| Unit IV | one dimensional array, two dimensional array | C37 | Lecture |
| | Class Room Assignment | C38 | Class Assignment |
| Unit IV | character array | C39 | Lecture |
| Unit IV | pointer data and pointer variables | C40 | Lecture |
| | Clarification Class | C40 | Clarification Class |
| | Webinar | C41 | Webinar |
| Unit IV | Object Oriented Concepts, Virtual Function & Polymorphism | C42 | Lecture |
| Unit IV | Abstraction, encapsulation | C43 | Lecture |
| Unit IV | Inheritance and Its types | C44 | Lecture |
| Unit IV | Inheritance and Its types | C45 | Lecture |
| | Home Assignment | | Home Assignments |
| Unit IV | Static and Dynamic binding | C46 | Lecture |
| | Guest Lecture | C47 | Guest lecture |
| Unit IV | Overloading | C48 | Lecture |
| Unit IV | Program Development: Object oriented analysis | C49 | Lecture |
| Unit IV | Design, unit testing & debugging | C50 | Lecture |
| Unit IV | system testing & integration | C51 | Lecture |
| | Webinar | C52 | Webinar |
| | Class Room Assignment | C53 | Class Assignment |
| | Quiz | C54 | Quiz |
| Unit IV | Virtual Functions and Polymorphism: Concept of Binding | C55 | Lecture |
| Unit IV | Early binding and late binding | C56 | Lecture |
| Unit IV | Virtual functions, Pure virtual functions | C57 | Lecture |
| Unit IV | Abstract classes, | C58 | Lecture |
| Unit IV | Virtual destructors & polymorphism | C59 | Lecture |
| Unit IV | Clarification Class | C60 | Clarification Class |

**19008700– Object Oriented Programming with C/C++ Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | sum and product of digits of an integer, reverse a number | P1-P2 | Practical |
| 2 | sum of the first n terms, Prime No. | P3-P4 | Practical |
| 3 | Factors, Swapping | P5-P6 | Practical |
| 4 | Triangle of stars, Array: Print even-valued elements, odd-valued elements | P7-P8 | Practical |
| 5 | sum and average of the elements of array, maximum and minimum element of array | P9-P10 | Practical |
| 6 | Concatenation of strings-Streams input output, half triangle of stars using streams | P11-P12 | Practical |
| 7 | Using operator overloading, implementation of matrix operations | P13-P14 | Practical |
| 8 | Using operator overloading and function overloading for string operations | P15-P16 | Practical |
| 9 | Calculate and print the sum and average of the elements of array, Print the maximum and minimum element of array, Write a program that swaps two numbers using pointers, Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main function. | P17-P20 | Practical |
| 10 | WAP to display Fibonacci series using iteration, WAP to calculate Factorial of a number using iteration, WAP to calculate Factorial of a number using recursion, Create Matrix class using templates | P19-P20 | Practical |
| 11 | Create Matrix class using templates | P21-P22 | Practical |
| 12 | Create a class Box containing length, breath and height and calculate surface area and volume. | P23-P24 | Practical |
| 13 | WAP for matrix addition, Using concept of constructor and destructors, create database for students database. | P24-P25 | Practical |

**19003800– Operating Systems**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Introduction to operating system | C1 | Lecture |
| Unit I | need and operating system services | C2 | Lecture |
| Unit I | operating system classification | C3 | Lecture |
| Unit I | batch processing, Multiprogramming, Multitasking, parallel Systems, | C4 | Lecture |
| Unit I | Distributed system, Real time system, SYSTEM CALL | C5 | Lecture |
| Unit I | Process concept, Process scheduling, | C6 | Lecture |
| Unit I | threads, overview of Inter process communication, | C7 | Lecture |
| Unit I | CPU scheduling, Dead Lock, Deadlock characteristic, Prevention | C8 | Lecture |
| | Clarification Class1 | C9 | Clarification Class |
| | Home ASSIGNMENT-1 | | Home Assignments |
| | Class Assignment-1 | C10 | Class Assignment |
| Unit II | Memory management | | |
| Unit II | Memory management | C11 | Lecture |
| Unit II | Logical versus Physical address space | C12 | Lecture |
| Unit II | Swapping, Partition, Paging and segmentation | C13 | Lecture |
| Unit II | Virtual memory: Demand paging | C14 | Lecture |
| Unit II | Page replacement algorithms, Allocation algorithms | C15 | Lecture |
| Unit II | Thrashing | C16 | Lecture |
| | Clarification Class 2 | C17 | Clarification Class |
| | Home ASSIGNMENT-2 | | Home Assignments |
| Unit III | File Management | | |
| Unit III | File Management | C18 | Lecture |
| Unit III | Seminar | C19 | Seminar |
| Unit III | File concept, access methods, and Directory structure | C20 | Lecture |
| Unit III | single level, two lever, tree structures | C21 | Lecture |
| Unit III | acrylic graph and general graph directory | C22 | Lecture |
| Unit III | file protection, free space management | C23 | Lecture |
| Unit III | Guest lecture | C24 | Guest lecture |
| Unit III | Clarification Class 3 | C25 | Clarification Class |
| Unit III | MCQ Quiz Based on job oriented | C26 | Quiz |
| | Home ASSIGNMENT-3 | | Home Assignments |
| Unit IV | Device Management: SEMAPHORE | | |
| Unit IV | Device Management: SEMAPHORE | C27 | Lecture |
| Unit IV | Disk Structure, Disk Scheduling | C28 | Lecture |
| Unit IV | Webinar | C29 | Webinar |
| Unit IV | FCFS Scheduling, SSTF Scheduling, | C30 | Lecture |
| Unit IV | SCAN Scheduling, C-SCAN Scheduling | C31 | Lecture |
| Unit IV | Disk Scheduling algorithm | C32 | Lecture |
| Unit IV | Presentation | C33 | Presentation |
| Unit IV | Presentation | C34 | Presentation |
| Unit IV | Avoidance, Detection and Recovery, Critical Section | C35 | Lecture |
| Unit IV | Synchronization, Hardware, Semaphore | C36 | Lecture |
| Unit IV | Combined Approach to dead lock Handling | C37 | Lecture |
| | Clarification Class 4 | C38 | Clarification Class |

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| | Class Room Assignment 3 | C39 | Class Assignment |
| Unit V | Goals of Protection, Domain of Protection, Access Matrix | C40 | Lecture |
| Unit V | Security and Authentication, Revocation of access Rights | C41 | Lecture |
| Unit V | Program Threats and System Threads | C42 | Lecture |
| Unit V | Clarification Class 5 | C43 | Clarification Class |
| | Guest lecture | C44 | Guest lecture |
| | Webinar | C45 | Webinar |

**19003900– Operating Functions Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Basic Commands in unix | P1-P2 | Practical |
| 2 | VI editor | P3-P4 | Practical |
| 3 | Shell Programming | P5-P6 | Practical |
| 4 | File Permission | P7-P8 | Practical |
| 5 | Factorial of any number | P9-P10 | Practical |
| 6 | Write a program to check whether a given string is palindrome or not. | P11-P12 | Practical |
| 7 | Simple Interest | P13-P14 | Practical |
| 8 | Activity1 | P15-P16 | Activity |
| 9 | Global and Internal Variables, Extern Variables | P17-P18 | Practical |
| 10 | Bitwise operators , Size of data Types , Switch Statement | P19-P20 | Practical |
| 11 | Area of Circle | P23-P24 | Practical |
| 12 | Nested If-else, Do while | P25-P26 | Practical |
| 13 | For Loop, other scrpitng Programmes | P27-P28 | Practical |
| 14 | Nano and emacs editor in linux | P29-P30 | Practical |

**19004000– Digital Electronic Circuits**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | NUMBER SYSTEMS: Introduction of Syllabus, Introduction of digital Electronics, Advantages of digital electronics, application of digital electronics, Modern day usage of Digital electronics | C1 | Lecture |
| Unit I | Introduction of Number System, Decimal, Hexadecimal number system, Octal Number system and Binary Number System | C2 | Lecture |
| Unit I | Conversion of Number System with Example | C3 | Lecture |
| Unit I | Conversion of Number System with Example-II | C4 | Lecture |
| Unit I | Home Assignment No. 1 - Based on Conversions | | Home Assignments |
| Unit I | Arithmetic Operation, Boolean Algebra, De Morgons, Theorem | C5 | Lecture |
| Unit I | Example based on Boolean Algebra | C6 | Lecture |
| Unit I | Example based on Boolean Algebra | C7 | Lecture |
| Unit I | Class Room Assignment No. 1 | C8 | Class Assignment |
| Unit I | Error detection and Corrections Codes | C9 | Lecture |
| Unit I | Clarification Class-1 | C10 | Clarification Class |
| Unit II | COMBINATIONAL CIRCUITS | | |
| Unit II | Simplification of Boolean Algebra, Introduction of K-Map | C11 | Lecture |
| Unit II | Simplification of Boolean using K-Map with Example | C12 | Lecture |
| Unit II | Home Assignment No- 2 based on Karnaugh Map | | Home Assignments |
| Unit II | Simplification of Boolean function using Q M Method | C13 | Lecture |
| Unit II | Half Adder, Full Adder, Subtractor, BCD Adder, Full Speed Adder, Multiplier, Divider, Decoder and Encoder | C14 | Lecture |
| Unit II | ALU, Code Conversions, Magnitude Comparators | C15 | Lecture |
| Unit II | Multiplexer, De-Multiplexer and Application of Multiplexer and De-Mux | C16 | Lecture |
| Unit II | Implementation using ROM, PLA, PAL, FPGA and TTL Ics for their Application | C17 | Lecture |
| Unit II | Implementation using ROM, PLA, PAL, FPGA and TTL Ics for their Application-II | C18 | Lecture |
| Unit II | Class Room Assignment No. 2 | C19 | Class Assignment |
| Unit II | Clarification Class - 2 | C20 | Clarification Class |
| Unit III | SEQUENTIAL CIRCUITS | | |
| Unit III | Various Types of Flip-Flops and their Conversions | C21 | Lecture |
| Unit III | Various Types of Flip-Flops and their Conversions-II | C22 | Lecture |
| Unit III | Seminar | C23 | Seminar |
| Unit III | Counter and Its Type | C24 | Lecture |
| Unit III | Presentation-I | C25 | Presentation |
| Unit III | Guest Lecture -1 | C26 | Guest lecture |
| Unit III | Design of Synchronous and Asynvhronous Sequential Circuits-II | C27 | Lecture |
| Unit III | Clarification Class -3 | C28 | Clarification Class |
| Unit III | Guest Lecture -2 | C29 | Guest lecture |

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|---|---|---|---|
| Unit III | Class Room Assignment 3 | C30 | Class Assignment |
| Unit IV | MEMORIES - TYPES OF ROM | | |
| Unit IV | Memory and Its Type | C31 | Lecture |
| Unit IV | Static and Dynamic Memory | C32 | Lecture |
| Unit IV | Representative Circuits for BJT | C33 | Lecture |
| Unit IV | Presentation-II | C34 | Presentation |
| Unit IV | Representative Circuits for BJT-II | C35 | Lecture |
| Unit IV | FET Transistor | C36 | Lecture |
| Unit IV | Webinar -2 | C37 | Webinar |
| Unit IV | Memory Expansion using IC | C38 | Lecture |
| Unit IV | Flash Memory, CCD, Latest Trends in memories | C39 | Lecture |
| Unit IV | ECI, TTL, MOS, CMOS logic families and their comparison | C40 | Lecture |
| Unit IV | Home Assignment No.3 | | Home Assignments |
| Unit IV | Activity | C41 | Activity |
| Unit IV | Fanout, unit load, current and voltage parameters | C42 | Lecture |
| Unit IV | Webinar | C43 | Webinar |
| Unit IV | Interfacing of TTL & CMOS Logic families | C44 | Lecture |
| Unit IV | Clarification Class -4 | C45 | Clarification Class |

**19004100– Digital Electronic Circuits Lab**

| S. No. | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| 1 | Introduction of digital laboratory equipment. Digital IC Trainer | P1-P2 | Practical |
| 2 | To study of basic gates and verify the truth - table | P3-P4 | Practical |
| 3 | Verification of Universal loic gates with truth-table | P5-P6 | Practical |
| 4 | Activity | P7-P8 | Activity |
| 5 | Design and Verification of Full adder and full subtractor | P9-P10 | Practical |
| 6 | Design and Verification of Full adder and full subtractor | P11 - P12 | Practical |
| 7 | To design and Implement Binary to Gray Conversion | P13-P14 | Practical |
| 8 | To design and Implement Gray to Binary Conversion | P15 - P16 | Practical |
| 9 | To design 1-bit comparator | P17-P18 | Practical |
| 10 | To design two bit comparator | P19-P20 | Practical |
| 11 | To design and construct basic flip flop | P21-P22 | Practical |
| 12 | Test | P23-P24 | Test |
| 13 | To design asynchronous counter | P25-P26 | Practical |
| 14 | To design synchronous counter | P27-P28 | Practical |
| 15 | Presentation-I | P29-P30 | Presentation |

**11012200– Human Values, Business & Managerial Ethics**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | Concept of values & its formation, Values & Behaviour | C-1 | Lecture |
| Unit I | Ethics Meaning, nature Scope | C-2 | Lecture |
| Unit I | Morality vs legality dilemma & Facts & Values & Subjectivism & Relativism | C-3 | Lecture |
| Unit I | Moral Development Kohalsberg 6 stage of moral development | C-4 | Lecture |
| Unit I | Myth of Moral Business | C-5 | Presentation |
| Unit I | Ethics & Business | C-6 | Clarification Class |
| Unit II | Decision Making (Normal Dilemma & Problems) | C-7 | Lecture |
| Unit II | Application of ethical theories in business Practice ie | C-8 | Class Assignment |
| Unit II | Utilitarianism (Bentham & J.S Mill) | C-9 | Lecture |
| Unit II | Take Home Assignment - I | | Home Assignment |
| Unit II | Deontology (I. Kant) | C-10 | Lecture |
| Unit II | Economic Justice: Distributive justice (John Rawls) & Libertarian justice (Robest Nozick) | C-11 | Presentation |
| Unit II | Virtue Ethics Theory (Aristotle) | C-12 | Clarification Class |
| Unit III | Concept of CSR , Changing expectation of society | C-13 | Lecture |
| Unit III | Model's Of CSR Carolls Model, Ackerman's CSR Model | C-14 | Webinar |
| Unit III | Why social Responsibility of Business, Arguments in favor of social responsibility | C-15 | Lecture |
| Unit III | Arguments against of social responsibility | C-16 | Lecture |
| Unit III | Take Home Assignment - II | | Home Assignment |
| Unit III | Consumerism & Consumer rights | C-17 | Class Assignment |
| Unit III | Ethical Issues in Business | C-18 | Clarification Class |
| Unit IV | Features of free and perfect competitive market, Monopoly & Oligopoly, Corruption & Bribery & Ethics in advertising | C-19 | Lecture |
| Unit IV | Corruption & Bribery & Ethics in advertising | C-20 | Lecture |
| Unit IV | Finance: Fairness and efficiency in financial market | C-21 | Guest Lecture |
| Unit IV | Insider trading & Green Mail & Golden parachute | C-22 | Lecture |
| Unit IV | HR: Worker Rights & duties & Work place Safety | C-23 | Lecture |
| Unit IV | Take Home Assignment - III | | Home Assignment |
| Unit IV | Sexual Harassment & Whistle Blowing policy | C-24 | Clarification Class |
| Unit V | Ethical Decision making | C-25 | Lecture |
| Unit V | Role of Moral philosophy in decision | C-26 | Lecture |
| Unit V | Argument for and against in decision making | C-27 | Class Assignment |
| Unit V | Challenges of ethical issues due to globalization | C-28 | Lecture |
| Unit V | Power & Politics in organization | C-29 | Quiz |
| Unit V | Hierarchism as organisation value & Indian ethos in Management | C-30 | Clarification Class |

**19004200– Ability and Skill Enhancement -III**

| Unit | Particulars | Class No. | Pedagogy of Class |
|---|---|---|---|
| Unit I | What is Book Review, Purpose & Importance of Book Review Types of Book Review, Elements & Steps of Writing Book Review | C-1 | Lecture |
| Unit I | Book Review Writing | C-2 | Class Assignment |
| Unit I | What is Movie Review, Purpose & Importance of Movie Review Types of Movie Review, Elements & Steps of Writing Movie Review | C-3 | Lecture |
| Unit I | Watch a movie | C-4 | Activity |
| Unit I | Write the review of the movie shown in the class | | Home Assignments |
| Unit I | Clarification Class Unit 1 | C-5 | Clarification Class |
| Unit II | Reading Comprehension | C-6 | Lecture |
| Unit II | Debate | C-7 | Class Assignment |
| Unit II | Rewriting Mythology/Folklore | C-8 | Lecture |
| Unit II | Watch an international greek myth or indian folklore | C-9 | Activity |
| Unit II | Rewriting Mythology/Folklore watched in the class | | Home Assignments |
| Unit II | News Analysis | C-10 | Activity |
| Unit II | Role Plays | C-11 | Lecture |
| Unit II | Role Plays | C-12 | Class Assignment |
| Unit III | What is emotional intelligence, E.Q. Tests, performing under pressure, how to take right decisions under pressure keeping balance in difficult emotional situations. The science of emotional intelligence, characteristics of emotional intelligence, | C-13 | Lecture |
| Unit III | Emotions handling- identifying good and bad emotions | C-14 | Lecture |
| Unit III | how to control emotions, how to manage negative emotions keeping balance of mental stability | C-15 | Lecture |
| Unit III | stress and distress | C-16 | Lecture |
| Unit III | Activity/Case Study | C-17 | Activity |
| Unit III | Unit 3 | C-18 | Clarification Class |
| Unit IV | What is GD, Types of Group Discussions | C-19 | Lecture |
| Unit IV | GD: Do's & Dont's, Participation, | C-20 | Lecture |
| Unit IV | GD: Thinking, Structuring, Group Behaviour | C-21 | Lecture |
| Unit IV | Leadership Skills, Interpersonal Skills, Persuasive Skills, Conceptualization Skills | C-22 | Lecture |
| Unit V | What is documentary, aims & objectives | C-23 | Lecture |
| Unit V | Documentary/Movie Screening & Reviews | C-24 | Activity |
| Unit V | documentary for social cause | C-25 | Presentation |
| Unit V | documentary for social cause: Screening and Narration | C-26 | Presentation |
| Unit V | preparing a documentary | | Home Assignments |
| Unit V | Unit 5 | C-27 | Clarification Class |
| | Webinar | C-28 | Webinar |
| | Seminar | C-29 | Seminar |
| | Guest Lecture | C-30 | Guest lecture |

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