1. **ANALOG AND DIGITAL ELECTRONICS(17CS32)**

- Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application
- Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, QuineMcClusky technique.
- Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches,Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
- Design of Counters, Registers and A/D & D/A converters

2. **DATA STRUCTURES AND APPLICATIONS(17CS33)**

- Explain different types of data structures, operations and algorithms
- Apply searching and sorting operations on files
- Make use of stack, Queue, Lists, Trees and Graphs in problem solving.
- Develop all data structures in a high-level language for problem solving.

3. **COMPUTER ORGANIZATION(17CS34)**

- Explain the basic organization of a computer system.
- Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
- Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing
systems.
- Build simple arithmetic and logical units.

4. **UNIX AND SHELL PROGRAMMING(17CS35)**

- Explain UNIX system and use different commands.
- Compile Shell scripts for certain functions on different subsystems.
- Demonstrate use of editors and Perl script writing.

5. **DISCRETE MATHEMATICAL STRUCTURES(17CS36)**

- Make use of propositional and predicate logic in knowledge representation and truth verification.
- Demonstrate the application of discrete structures in different fields of computer science.
- Solve problems using recurrence relations and generating functions.
- Apply different mathematical proofs, techniques in proving theorems.
- Compare graphs, trees and their applications.

6. **ANALOG AND DIGITAL ELECTRONICS LABORATORY(17CSL37)**

- Demonstrate various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
- Design and demonstrate various combinational logic circuits.
- Design and demonstrate various types of counters and Registers using Flip-flops
- Make use of simulation package to design circuits.
- Infer the working and implementation of ALU.

7. **DATA STRUCTURES LABORATORY(17CSL38)**

- Demonstrate the working nature of different types of data structures and their applications
- Develop, analyze and evaluate the searching and sorting algorithms
- Choose the appropriate data structure for solving real world problems

8. **OBJECT ORIENTED CONCEPTS(**17CS42)

- Explain the object-oriented concepts and JAVA.

- Develop computer programs to solve real world problems in Java.
- Develop simple GUI interfaces for a computer program to interact with users, and to comprehendthe event-based GUI handling principles using Applets and swings.

9. **DESIGN AND ANALYSIS OF ALGORITHMS(**17CS43)
   - Describe computational solution to well known problems like searching, sorting etc.
   - Estimate the computational complexity of different algorithms.
   - Develop an algorithm using appropriate design strategies for problem solving.
10. **MICROPROCESSORS AND MICROCONTROLLERS(17CS44)**
    - Differentiate between microprocessors and microcontrollers
    - Develop assembly language code to solve problems
    - Explain interfacing of various devices to x86 family and ARM processor
    - Demonstrate interrupt routines for interfacing devices
11. **SOFTWARE ENGINEERING(17CS45)**
    - Design a software system, component, or process to meet desired needs within realistic constraints.
    - Assess professional and ethical responsibility
    - Function on multi-disciplinary teams
    - Make use of techniques, skills, and modern engineering tools necessary for engineering practice
    - Comprehend software systems or parts of software systems.
12. **DATA COMMUNICATION(17CS46)**
    - Illustrate basic computer network technology.
    - Identify the different types of network topologies and protocols.
    - List and explain the layers of the OSI model and TCP/IP model.
    - Comprehend the different types of network devices and their functions within a network
    - Demonstrate subnetting and routing mechanisms.
13. **DESIGN AND ANALYSIS OF ALGORITHM LABORATORY(**17CSL47)
    - Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
    - Develop variety of algorithms such as sorting, graph related, combinatorial, etc., in a high level language.
    - Analyze and compare the performance of algorithms using language features.
    - Apply and implement learned algorithm design techniques and data structuresto solve real-world problems.
14. **MICROPROCESSOR AND MICROCONTROLLER LABORATORY(**17CSL48)
    - Summarize 80x86 instruction sets and comprehend the knowledge of how assembly language works.
    - Design and develop assembly programs using 80x86 assembly language instructions
    - Infer functioning of hardware devices and interfacing them to x86 family
    - Choose processors for various kinds of applications.

15. **MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY(**17CS51)
    - Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
    - Utilize the resources available effectively through ERP
    - Make use of IPRs and institutional support in entrepreneurship.
16. **COMPUTER NETWORKS(**17CS52)
    - Explain principles of application layer protocols
    - Outline transport layer services and infer UDP and TCP protocols
    - Classify routers, IP and Routing Algorithms in network layer
    - Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard
    - Define Multimedia Networking and Network Management.
17. **DATABASE MANAGEMENT SYSTEM(**17CS53)
    - Summarize the concepts of database objects; enforce integrity constraints on a database using RDBMS.
    - Use Structured Query Language (SQL) for database manipulation.
    - Design simple database systems
    - Design code for some application to interact with databases.
18. **AUTOMATA THEORY AND COMPUTABILITY(**17CS54)
    - Tell the core concepts in automata theory and Theory of Computation
    - Explain how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
    - Interpret Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
    - Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
    - Classify a problem with respect to different models of Computation.
19. **OBJECT ORIENTED MODELING AND DESIGN(**17CS551)
    - Describe the concepts of object-oriented and basic class modelling.
    - Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
    - Choose and apply a befitting design pattern for the given problem.
20. **SOCIAL NETWORK ANALYSIS(**17IS552)
    - Define notation and terminology used in network science.
    - Demonstrate, summarize and compare networks.
    - Explain basic principles behind network analysis algorithms.
    - Analyze real world network.
21. **ADVANCED JAVA AND J2EE(**17CS553)
    - Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
    - Build client-server applications and TCP/IP socket programs
    - Illustrate database access and details for managing information using the JDBC API
    - Describe how servlets fit into Java-based web application architecture
    - Develop reusable software components using Java Beans.
22. **PROGRAMMING LANGAUGES(**17IS554)
    - Select appropriate languages for given applications

- Compare and contrast the strengths and weaknesses of different languages.

23. **PROGRAMMING IN JAVA(**17CS561)
    - Explain the object-oriented concepts and JAVA.
    - Develop computer programs to solve real world problems in Java.
    - Develop simple GUI interfaces for a computer program to interact with users.
24. **ARTIFICIAL INTELLIGENCE(**17CS562)
    - Identify the AI based problems
    - Apply techniques to solve the AI problems
    - Define learning and explain various learning techniques
    - Discuss expert systems.
25. **EMBEDDED SYSTEMS(**17CS563)
    - Distinguish the characteristics of embedded computer systems.
    - Identify the various vulnerabilities of embedded computer systems.
    - Design and develop modules using RTOS.
    - Explain RPC, threads and tasks.
26. **DOT NET FRAMEWORK FOR APPLICATION DEVELOPMENT(**17CS564)
    - Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
    - Demonstrate Object Oriented Programming concepts in C# programming language
    - Design custom interfaces for applications and leverage the available built-in interfaces
      in building complex applications.
    - Illustrate the use of generics and collections in C#
    - Compose queries to query in-memory data and define own operator behavior.
27. **CLOUD COMPUTING(**17CS565)
    - Explain the concepts and terminologies of cloud computing
    - Demonstrate cloud frameworks and technologies
    - Define data intensive computing
    - Demonstrate cloud applications.
28. **COMPUTER NETWORK LABORATORY(**17CSL57)
    - Analyze and Compare various networking protocols.
    - Demonstrate the working of different concepts of networking.
    - Implement and analyze networking protocols in NS2 / NS3.
29. **DBMS LABORATORY WITH MINI PROJECT(**17CSL58)
    - Use Structured Query Language (SQL) for database Creation and manipulation.
    - Demonstrate the working of different concepts of DBMS
    - Implement and test the project developed for an application.
30. **CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW(**17CS61)
    - Discuss cryptography and its need to various applications
    - Design and develop simple cryptography algorithms
    - Understand cyber security and need cyber Law.

31. **FILE STRUCTURES(**17IS62)
    - Discuss appropriate file structure for storage representation.

- Illustrate a suitable sorting technique to arrange the data.
- Explain indexing and hashing techniques for better performance to a given problem.

32. **SOFTWARE TESTING(**17IS63)
    - Discuss test cases for any given problem
    - Compare the different testing techniques
    - Illustrate the problem into suitable testing model
    - Understand the appropriate technique for the design of flow graph.
    - Design and Develop appropriate document for the software artefact.
33. **OPERATING SYSTEMS(**17CS64)
    - Demonstrate need for OS and different types of OS
    - Discuss suitable techniques for management of different resources
    - Illustrate processor, memory, storage and file system commands
    - Explain the different concepts of OS in platform of usage through case studies
34. **DATA MINING AND DATA WAREHOUSING(**17CS651)
    - Understand data mining problems and implement the data warehouse
    - Demonstrate association rules for a given data pattern.
    - Discuss between classification and clustering solution.
35. **SYSTEM SOFTWARE(**17IS652)
    - Explain system software such as assemblers, loaders, linkers and macroprocessors
    - Design and develop lexical analyzers, parsers and code generators
    - Understand lex and yacc tools for implementing different concepts of system Software.
36. **OPERATIONS RESEARCH(**17CS653)
    - Explain optimization techniques for various problems.
    - Understand the given problem as transportation and assignment problem and solve.
    - Illustrate game theory for decision support system.
37. **DISTRIBUTED COMPUTING SYSTEM(**17CS654)
    - Explain the characteristics of a distributed system along with its and design challenges
    - Illustrate the mechanism of IPC between distributed objects
    - Describe the distributed file service architecture and the important characteristics of SUN NFS.
    - Discuss concurrency control algorithms applied in distributed transactions.
38. **MOBILE APPLICATION DEVELOPMENT(**17CS661)
    - Design and Develop Android application by setting up Android development environment
    - Implement adaptive, responsive user interfaces that work across a wide range of devices.
    - Explain long running tasks and background work in Android applications
    - Demonstrate methods in storing, sharing and retrieving data in Android applications
    - Discuss performance of android applications and understand the role of permissions and security
    - Describe the steps involved in publishing Android application to share with the world.
39. **BIG DATA ANALYTICS(**17CS662)

- Explain the importance of data and data analysis
- Interpret the probabilistic models for data
- Illustrate hypothesis, uncertainty principle
- Demonstrate regression analysis.

40. **WIRELESS NETWORKS AND MOBILE COMPUTING(**17CS663)
    - Understand various mobile communication systems.
    - Describe various multiplexing systems used in mobile computing.
    - Explain the use and importance of data synchronization in mobile computing
41. **PYTHON APPLICATION PROGRAMMING(**17CS664)
    - Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
    - Demonstrate proficiency in handling Strings and File Systems.
    - Implement Python Programs using core data structures like Lists, Dictionaries and use

      Regular Expressions.
    - Interpret the concepts of Object-Oriented Programming as used in Python.
    - Implement exemplary applications related to Network Programming, Web Services and Databases in Python.
42. **SERVICE ORIENTED ARCHITECTURE(**17CS665)
    - Understand the different IT architecture
    - Explain SOA based applications
    - Illustrate of web service and realization of SOA
    - Discuss RESTful services.
43. **MULTI-CORE ARCHITECTURE AND PROGRAMMING(**17CS666)
    - Identify the issues involved in multicore architectures
    - Explain fundamental concepts of parallel programming and its design issues
    - Solve the issues related to multiprocessing and suggest solutions
    - Discuss the salient features of different multicore architectures and how they exploit parallelism
    - Illustrate OpenMP and programming concept.
44. **SOFTWARE TESTING LABORATORY(**17ISL67)
    - Understand requirements for the given problem
    - Design and implement the solution for given problem in any programming language(C,C++,JAVA)
    - Discuss test cases for any given problem
    - Apply the appropriate technique for the design of flow graph.
    - Create appropriate document for the software artefact.
45. **FILE STRUCTURES LABORATORY WITH MINI PROJECT(**17ISL68)
    - Implement operations related to files
    - Apply the concepts of file system to produce the given application.
    - Evaluate performance of various file systems on given parameters.

46. **WEB TECHNOLOGY AND ITS APPLICATIONS(17CS71)**
    - Define HTML and CSS syntax and semantics to build web pages.

- Understand the concepts of Construct , visually format tables and forms using HTML
  using CSS
- Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
- List the principles of object oriented development using PHP
- Illustrate JavaScript frameworks like jQuery and Backbone which facilitates.

47. **SOFTWARE ARCHITECTURE AND DESIGN PATTERNS(**17IS72)
    - Design and implement codes with higher performance and lower complexity
    - Illustrate the code qualities needed to keep code flexible
    - Define core design principles and understand the importance to assess the quality of a design with respect to these principles.
    - List the capabilities of applying these principles in the design of object oriented systems.
    - Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
    - Recall the suitable select and apply patterns in specific contexts
48. **MACHINE LEARNING(**17CS73)
    - Recall the problems for machine learning. And select the either supervised, unsupersvised
      or reinforcement learning.
    - Understand theory of probability and statistics related to machine learning
    - Illustrate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,
49. **NATURAL LANGUAGE PROCESSING(**17CS741)
    - Analyze the natural language text.
    - Define the importance of natural language.
    - Understand the concepts Text mining.
    - Illustrate information retrieval techniques.
50. **CLOUD COMPUTING AND ITS APPLICATIONS(**17CS742)
    - Understand the concepts of cloud computing, virtualization and classify services of cloud computing
    - Illustrate architecture and programming in cloud
    - Define the platforms for development of cloud applications and List the application ofcloud.
51. **INFORMATION AND NETWORK SECURITY(**17CS743)
    - Analyze the Digitals security lapses
    - Illustrate the need of key management
52. **UNIX SYSTEM PROGRAMMING(**17CS744)
    - Understand the working of Unix Systems
    - Illustrate the application/service over a UNIX system.
53. **SOFT AND EVOLUTIONARY COMPUTING(**17CS751)
    - Understand soft computingtechniques
    - Apply the learned techniquesto solve realistic problems
    - Differentiate soft computing with hard computing techniques
54. **COMPUTER VISION AND ROBOTICS(**17CS752)

- Implement fundamental image processing techniques required for computer vision
- Perform shape analysis
- Implement boundary tracking techniques
- Apply chain codes and other region descriptors
- Apply Hough Transform for line, circle, and ellipse detections.
- Apply 3D vision techniques.
- Implement motion related techniques.
- Develop applications using computer vision techniques.

55. **INFORMATION MANAGEMENT SYSTEM(**17IS753)
    - Understand the role of information technology and information systems in business
    - Illustrate the current issues of information technology and relate those issues to the firm
    - Interpret how to use information technology to solve business problems
56. **STORAGE AREA NETWORKS(**17CS754)
    - Identify key challenges in managing information and analyze different storage networking technologies and virtualization
    - Explain components and the implementation of NAS
    - Describe CAS architecture and types of archives and forms of virtualization
    - Illustrate the storage infrastructure and management activities
57. **MACHINE LEARNING LABORATORY(**17CSL76)
    1. Understand the implementation procedures for the machine learning algorithms.
    2. Design Java/Python programs for various Learning algorithms.
    3. Apply appropriate data sets to the Machine Learning algorithms.
    4. Identify and apply Machine Learning algorithms to solve real world problems.
58. **WEB TECHNOLOGY LABORATORY WITH MINI PROJECT(**17CSL77)

- Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
- Understand the concepts of Web Application Terminologies, Internet Tools other web services.
- Recall how to link and publish web sites

58. INTERNET OF THINGS TECHNOLOGY(17CS81)

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

59. **BIG DATA ANALYTICS(**17CS82)
    - Explain the concepts of HDFS and MapReduce framework
    - Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
    - Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
    - Infer the importance of core data mining techniques for data analytics
    - Compare and contrast different Text Mining Techniques
60. **HIGH PERFORMANCE COMPUTING(**17CS831)
    - Illustrate the key factors affecting performance of CSE applications
    - Infer mapping of applications to high-performance computing systems
    - Apply hardware/software co-design for achieving performance on real-world applications
61. **USER INTERFACE DESIGN(**17CS832)
    - Design the user interface, menu creation and windows creation and connection between menu and windows
    - Describe and explain the user interface design process
62. **VIRTUAL REALITY(**17IS833)
    - Illustrate technology, underlying principles, its potential and limits and to learn about the criteria for defining useful applications.
    - Explain process of creating virtual environments
63. **SYSTEM MODELLING AND SIMULATION(**17CS834)
    - Explain the system concept and apply functional modeling method to model the activities of a static system
    - Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
    - Illustrate the operation of a dynamic system and make improvement according to the simulation results.
64. **INTERNSHIP / PROFESSIONAL PRACTISE(**17IS84)

    Adapt easily to the industry environment

    Take part in team work

    Make use of modern tools

    Decide upon project planning and financing.

    Adapt ethical values

    Motivate for lifelong learning
65. **PROJECT WORK PHASE II(**17ISP85)

    Identify a issue and derive problem related to society, environment, economics, energy and technology

    Formulate and Analyze the problem and determine the scope of the solution chosen

    Determine , dissect, and estimate the parameters, required in the solution.

Evaluate the solution by considering the standard data / Objective function and by

using appropriate performance metrics.

Compile the report and take part in present / publishing the finding in a reputed

conference / publications

Attempt to obtain ownership of the solution / product developed.

66. **SEMINAR(**17ISS86)
    - Survey the changes in the technologies relevant to the topic selected
    - Discuss the technology and interpret the impact on the society, environment and domain.
    - Compile report of the study and present to the audience, following the ethics.