KAMARAJ COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution - AFFILIATED TO ANNA UNIVERSITY, CHENNAI)

S.P.G.Chidambara Nadar - C.Nagammal Campus

S.P.G.C.Nagar, K.Vellakulam - 625 701, (Near Virudhunagar), Madurai District.

B.TECH. INFORMATION TECHNOLOGY

Regulation - 2020

AUTONOMOUS SYLLABUS

CHOICE BASED CREDIT SYSTEM (CBCS)

CURRICULUM AND SYLLABI

(III & IV)

VISION:

To make the department of Information Technology the unique of its kind in the field of Research and Development activities in this part of world

MISSION:

To impart highly innovative and technical knowledge in the field of Information Technology to the urban and unreachable rural student folks through Total Quality Education.

PROGRAM EDUCATIONAL OBJECTIVES:

PEO 1:

Technical Knowledge : Graduates will be able to identify, analyze and create solutions for real life, industrial and societal needs by applying the principles and practices of Information Technology.

PEO 2:

Teamwork &Ethics : Graduates will be able to collaborate effectively and ethically in a multi-disciplinary team as a member &/ as a leader.

PEO 3:

Lifelong Learning : Graduates will be able to adopt the contemporary technologies in the field of Information Technology to provide solutions for challenging environments.

PROGRAM OUTCOMES:

After going through the four years of study, the Information Technology graduates will have the ability to

	Graduate Attribute	**Programme Outcome**
1	Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	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.
3	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.
4	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
5	Modern tool usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
6	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
7	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.

8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team work	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	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.
11	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.
12	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.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1 :

Demonstrate technical and interpersonal skills to design and develop IT enabled solutions to meet the real time industrial and societal needs

PSO2:

Exhibit an ability to adapt to the evolutionary changes in computing

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SEMESTER III

SI. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	MA1301	Discrete Mathematics and Probability	BS	3	1	0	4	4
2	IT1371	Computer Organization and Architecture	PC	3	0	0	3	3
3	IT1301	Object Oriented Programming	PC	3	0	0	3	3
4	EC1306	Digital Systems	ES	3	0	0	3	3
5	EE1308	Fundamentals Of Electrical and Electronics Engineering	ES	3	0	0	3	3
PRACTICAL								
6	IT1311	Object Oriented Programming Laboratory	PC	0	0	4	4	2
7	EC1316	Digital Systems Laboratory	ES	0	0	4	4	2
8	EE1282	Fundamentals of Electrical and Electronics Engineering Laboratory	ES	0	0	4	4	2
9	HS1321	Interpersonal Skills - Listening and Speaking	EEC	0	0	2	2	1
			TOTAL	**15**	**1**	**14**	**30**	**23**

SEMESTER IV

Sl. No.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	CS1371	Database Management Systems	PC	3	0	0	3	3
2	IT1401	Data Structures	PC	3	0	0	3	3
3	IT1402	Operating Systems	PC	3	0	0	3	3
4	IT1403	Software Engineering	PC	3	0	0	3	3
5	EC1406	Communication Engineering	PC	3	0	0	3	3
PRACTICAL								
6	CS1381	Database Management Systems Laboratory	PC	0	0	4	4	2
7	IT1411	Data Structures Laboratory	PC	0	0	4	4	2
8	IT1412	Operating Systems Laboratory	PC	0	0	4	4	2
9	HS1421	An Introduction to Advanced Reading and Writing	EEC	0	0	2	2	1
			TOTAL	**15**	**0**	**14**	**29**	**22**

SEMESTER III

MA1301 DISCRETE MATHEMATICS AND PROBABILITY

L	T	P	C
3	1	0	4

OBJECTIVES:

- To make the students understand the principles of proposition and predicate logic to validate the statements in a given context.
- To make the students aware of the basic terminologies and ideas to solve simple problems using combinatorics.
- To make the students understand the basic concepts of graph theory.
- To make the students aware of the basics of random variables and standard distributions to solve simple real life problems.
- To make the students understand the basic concepts of two dimensional random variables.

UNIT I PROPOSITION AND PREDICATE LOGIC 12

Basic connectives – Truth Table – Tautological Implications – Propositional equivalences – Normal Forms – Rules of inference – Predicates and quantifiers – Nested quantifiers – Universe of Discourse – Theory of inference for Predicate calculus.

UNIT II COMBINATORICS 12

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

UNIT III GRAPH THEORY AND ITS APPLICATIONS 12

Graphs – Matrix representation of graphs – Graph isomorphism – connectivity – Eulerian and Hamiltonian graphs (Proof excluded) – Prim's Algorithm – Dijkstra's Algorithm – Problems.

UNIT IV PROBABILITY AND RANDOM VARIABLE 12

Probability – conditional probability – Baye's theorem – Random variables – Expectation of Random Variables – Moments – Moment generating functions –Characteristic function – Distributions: Geometric, Uniform, Exponential and Normal.

UNIT V TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of Random Variables – Central limit theorem (proof excluded).

TOTAL: 60 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1	Use Predicate and Propositional logic to derive new inference from a given scenario
CO2	Solve problems using Mathematical Induction, Permutation & Combination and Recurrence relations
CO3	Solve problems using Mathematical Induction, Permutation & Combination and Recurrence relations
CO4	Demonstrate the use of probability and distributions to solve real life problems
CO5	Compute the correlation of two random variables and linear regression equation for a set of data

TEXT BOOKS:

1. Rosen, K.H, 2011, *Discrete Mathematics and its Applications*, Tata McGraw Hill Pub. Co. Ltd, 7th Edition, New Delhi.
2. Johnson, R.A, Miller, I., & Freund J, 2015, *Miller and Freund's Probability and Statistics for Engineers*, Pearson Education, 8th Edition, Asia.

REFERENCES:

1. Grimaldi, R.P, 2007, *Discrete and Combinatorial Mathematics: An Applied Introduction*, Pearson Education Asia, 4th Edition, Delhi.
2. Lipschutz, S, & Mark Lipson, 2010, *Discrete Mathematics*, Tata McGraw Hill Pub. Co. Ltd, 3rd Edition, New Delhi.
3. Koshy, T, 2006, *Discrete Mathematics with Applications*, Elsevier Publications.
4. Ross, S.M, 2004, *Introduction to Probability and Statistics for Engineers and Scientists*,

Elsevier, 3rd Edition.

5. Spiegel, M.R, Schiller, J, &Srinivasan, R.A., 2004, *Schaum's Outline of Theory and Problems of Probability and Statistics*, Tata McGraw Hill Edition.

WEB REFERENCES:

1. http://discrete.openmathbooks.org/pdfs/dmoi-tablet.pdf
2. https://www.cis.upenn.edu/~jean/discmath-root-b.pdf
3. http://www.r-5.org/files/books/computers/algo-list/statistics/probability/Sheldon_M_Ross-Introduction_to_Probability_and_Statistics-EN.pdf

IT1371 COMPUTER ORGANIZATION AND ARCHITECTURE

L	T	P	C
3	0	0	3

OBJECTIVES:

This course enables the students to

- Understand the basic structure, operations and instructions of a digital computer.
- Learn the implementation of fixed point and floating-point arithmetic operations.
- Be familiar with the basic processing unit and multiple functional units in a processor.
- Understand the hierarchical memory system and I/O organization.
- Learn the concepts of instruction level parallelism, data level parallelism and loop level parallelism.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional Units – Basic Operational Concepts – Bus Structures – Software – Performance: Processor Clock, Basic Performance Equation, Clock Rate – Instruction Set: CISC and RISC – Memory Locations and Addresses – Memory Operations – Instructions and Instruction Sequencing – Addressing Modes – Basic Input/output Operations.

UNIT II ARITHMETIC UNIT 9

Addition and Subtraction of Signed Numbers – Design of Fast Adders – Multiplication of Positive Numbers – Signed Operand Multiplication – Fast Multiplication – Integer Division – Floating Point Numbers and Operations.

UNIT III PROCESSING UNIT 9

Basic Processing Unit: Fundamental Concepts – Execution of a complete instruction – Multiple-bus organization – Hardwired Control – Microprogrammed control – Pipelining: Basic Concepts – Data Hazards – Instruction Hazards – Datapath and Control Considerations.

UNIT IV MEMORY SYSTEMS & INPUT / OUTPUT ORGANIZATION 9

Memory Systems: Basic Concepts – Cache Memories – Performance Considerations – Virtual Memories – Memory Management Requirements – Secondary Storage – Input / Output Organization: Accessing I/O Devices – Interrupts – Direct Memory Access – Buses – Synchronous Bus – Asynchronous Bus.

UNIT V PARALLEL PROCESSING 9

Instruction-Level Parallelism: Concepts and Challenges – Basic compiler techniques for exposing ILP – Overcoming Data Hazards with Dynamic Scheduling – Dynamic Scheduling: Examples and the Algorithm – Data-Level Parallelism: Introduction – Vector Architecture – Graphics Processing Units – Detecting and Enhancing Loop-Level Parallelism.

TOTAL: 45 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Summarize the functionalities of various parts, instruction sets and operations of a digital computer.

CO2 Utilize the logic design for fixed-point and floating point arithmetic.

CO3 Interpret the role of a processing unit and multiple functional units.

CO4 Explain the various elements in memory hierarchy and the basic and complex I/O structures.

CO5 Demonstrate how parallelism is used at instruction-level and data-level parallelism.

TEXT BOOKS:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky and NaraigManjikian, *"Computer Organization and Embedded Systems"*, Sixth Edition, Tata McGraw Hill, 2012.

REFERENCES:

1. David A. Patterson and John L. Hennessy, *"Computer Organization and Design: The Hardware/Software Interface*", Fifth Edition, Morgan Kaufmann / Elsevier, 2014.
2. William Stallings, *"Computer Organization and Architecture – Designing for Performanc*e", Eighth Edition, Pearson Education, 2010.
3. John P. Hayes, *"Computer Architecture and Organization*", Third Edition, Tata McGraw Hill, 2012.

IT1301 OBJECT ORIENTED PROGRAMMING

L	T	P	C
3	0	0	3

OBJECTIVES:

This course enables the students to

- understand Object Oriented Programming concepts and basic characteristics of JAVA
- enhance the programming skill using inheritance and interfaces
- use exception handlers and generic programming for developing JAVA applications
- build a JAVA applications using event driven programming and I/O streams
- develop a JAVA application with multithreading programming

UNIT I INTRODUCTION TO OBJECT ORIENTED CONCEPTS AND JAVA PROGRAMMING 10

Introduction to Object Oriented Programming: Abstraction, Objects and Classes, Encapsulation, Inheritance, Polymorphism – **Introduction to JAVA:** Characteristics of Java, The Java Environment, Java Source File Structure, Compilation – **Fundamental Programming Structures in Java:** Data type and Variables, Operators, Decision making and Looping – **Classes:** Predefined class, User defined class, Access modifiers – **Object:** Object reference, Object cloning, Reflection – **Methods:** Types of method definition – Arrays – Strings – **Constructor:** Default constructor, Parameterized constructor – **Package:** Predefined package, util package, Understanding class path, User defined package – Javadoc comments.

UNIT II INHERITANCE AND POLYMORPHISM 9

Inheritance: Single Inheritance, Multilevel Inheritance, Hierarchical Inheritance, Super keyword – Interface – **Polymorphism:** Method overloading, Method overriding – **Non-Access modifiers:** Abstract class and method, Static keyword, Final keyword – **Inner class:** Nested

classes, Static inner class, Anonymous class.

UNIT III EXCEPTION HANDLING AND GENERIC PROGRAMMING 9

Exception Handling: Garbage collection, Finalize() method, Throwable interface, Types of exception, **Exception handlers:** Try, Catch, Finally, Throw, Throws, User define exception – **Generic programming:** Generic class, Generic method, Restrictions and limitations, Inheritance rule for generic types, Wild card types, Reflections and generics – Collection framework: Map/List, Set, Array List / Linked List, Hash Set Collection Classes, TreeMap – Lambda expression.

UNIT IV STREAMS AND EVENT DRIVEN PROGRAMMING 10

Input and Output: Byte stream, Character stream, Reading and writing from console and files, Object Streams and Serialization – **Java Database Connectivity (JDBC):** Creating a database, Insertion operation, Deletion operation, Updation operation, Display operation – Event Driven programming: Introduction to Swing, MVC Framework, Frame, **Components:** Text field, Input, Choice, Text Area, Buttons, Checkboxes, Radio Buttons, Lists, Menus, Dialog Box, Windows, Mouse, **Layout Management:** Border layout, Flow layout, Card layout, Grid layout, Gridbag layout – **Listeners:**ActionListener, ItemListener, MouseListener, KeyboardListener, WindowListener – Adapter classes.

UNIT V MULTITHREADING PROGRAMMING 7

Multithreading: Thread states, Thread life cycle, Thread properties, Thread priorities, Thread synchronization – Archive – Case study.

TOTAL: 45 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1	Demonstrate the basic concepts of object oriented programming using JAVA
CO2	Make use of the OOP concept and non-access modifiers to solve real world problems
CO3	Choose an appropriate exception handler and generic data type for writing a JAVA application
CO4	Select the appropriate features of event driven programming and I/O streams to give solution to real time problems

CO5 Apply multithreading programming to generate synchronized threads

TEXT BOOKS

1. Cay S. Horstmann, Gary Cornell*, "Core Java: Volume I – Fundamentals",* Prentice Hall, Tenth Edition, 2015.
2. Cay S. Horstmann, Gary Cornell*, "Core Java: Volume II – Fundamentals*", Prentice Hall, Tenth Edition, 2016.

REFERENCE BOOKS

1. Herbert Schildt, *"Java: The Complete Reference"*, Eleventh Edition, McGraw Hill Education, 2014.
2. Paul Deitel ,HarveyDeitel *" Java SE8 for Programmers"*, Pearson Education, Third Edition,2014.
3. P.J.Deitel&H.M.Deitel, *"Java: How to Program Java 2"*, Prentice Hall, Seventh Edition, 2011.

EC1306 DIGITAL SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

- To present the Digital fundamentals, Boolean algebra and its applications in digital systems
- To familiarize with the design of various combinational digital circuits using logic gates
- To design the synchronous and Asynchronous counters and shift registers by using Flip Flops.
- To introduce the modelling of logic circuits by Verilog HDL.
- To introduce different types of memory and its design.

UNIT I DIGITAL FUNDAMENTALS 9

Review of Number systems, Logic gates, Boolean algebra, Boolean postulates and laws - De-Morgan's Theorem - Principle of Duality, Simplification using Boolean algebra, Canonical forms - Sum of product and Product of sum - Minimization using Karnaugh map - NAND and NOR Implementation

UNIT II COMBINATIONAL CIRCUITS **9**

Realization of combinational logic using gates , Design of combinational circuits : Adder , Subtractor, Parallel adder / Subtractor, Magnitude Comparator, Parity generator and checker, Encoder, Decoder, Multiplexer, Demultiplexer - Code converters.

UNIT III SYNCHRONOUS SEQUENTIAL CIRCUITS **9**

Latches, Flip-Flops-SR, JK, D & T, Shift Registers - SISO, SIPO, PISO, PIPO, Design of Synchronous Sequential Circuits - State Table and State Diagrams, Design of Counters - Modulo N counters, Random Sequence counters, Johnson counter, Ring counter, Up/Down counters.

UNIT IV MODELLING OF LOGIC CIRCUITS BY VERILOG HDL **9**

Lexical Conventions, Ports and Modules, Gate Level Modelling, Operators, Data Flow Modelling, Behavioral level Modelling - Modelling of Combinational and Sequential Logic Circuits using Verilog HDL.

UNIT V MEMORY AND PROGRAMMABLE LOGIC DEVICES **9**

RAM - ROM - Basic Structure, Types - Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Implementation of combinational logic circuits using PLA, PAL. Hazards - Hazard free realization.

TOTAL: 45 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Outline the Boolean functions and various minimization techniques.

CO2 Illustrate the combinational circuits used to perform basic digital operations.

CO3 Develop a synchronous/asynchronous counters and shift registers using sequential logic.

CO4 Implement combinational and sequential logic circuits using Verilog HDL.

CO5 Design combinational circuits using programmable logic devices and Memory Devices.

TEXT BOOKS

1. M. Morris Mano, Michael D. Ciletti, 2017, *Digital Design: With an Introduction to the Verilog HDL, VHDL, and SystemVerilog*, 6th Edition, Pearson Education.

REFERENCE BOOKS

1. Charles H.Roth, 2013, *Fundamentals of Logic Design*, 6th Edition, Thomson Learning.
2. Wakerly J F, 2002, *Digital Design: Principles and Practices*, 2nd Edition, Prentice-Hall.
3. D. D. Givone, 2003, *Digital Principles and Design*, Tata Mc-Graw Hill, New Delhi.
4. Thomas L. Floyd, 2011, *Digital Fundamentals*, 10th Edition, Pearson Education Inc.
5. Stephen Brown &ZvonkoVranesic, 2013, *Fundamentals of Digital Logic with Verilog Design*, Third Edition, McGraw-Hill Higher Education, New Delhi, India.

EE1308 FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING

L	T	P	C
3	0	0	3

OBJECTIVES:

- To explain the basic concepts involved in the analysis of electrical circuits and systems.
- To impart knowledge on electric machinery such as motors, generators and transformers.
- To describe how devices such as semiconductor diodes, transistor and operational amplifier are used in the design and analysis of electronic circuits.
- To comprehend the principles of digital circuits and its applications using Flip flops, Registers, Counters, Multiplexer and De multiplexer,
- To explain the construction and operation of different types of measuring instruments and transducers.

UNIT I BASIC ELECTRICAL CIRCUITS AND SYSTEMS 9

Electrical circuit elements (R, L and C) - Dependent and independent DC sources – Ohm's Law- Kirchhoff's laws - mesh current and node voltage methods (Analysis with only independent DC source) - Three phase supply (Star & Delta connection) - Basics of Energy Tariff calculation.

UNIT II ELECTRICAL MACHINES 9

Principles of operation and characteristics of; DC machines (Series, Shunt Motors and Generator) - Construction and working of Transformers (single and three phase), AC generators - single phase capacitor start/run induction motors.

UNIT III ELECTRONIC DEVICES & CIRCUITS 9

Types of Materials – Silicon & Germanium- N type and P type materials – Operation & VI characteristics; PN Junction Diode &Zener Diode – Bipolar Junction Transistor Characteristics – Introduction to Operational Amplifier –Inverting Amplifier –Non Inverting Amplifier – Passive Filters (Low pass & High Pass).

UNIT IV DIGITAL ELECTRONICS 9

Number System – Basic Boolean laws – Demorgan's theorem– Logic Gates - Introduction to combinational Circuits (Half adder, Full adder, Multiplexer and Demultiplexer) - Introduction to sequential Circuits (SR, JK, D, T Flip-Flops - Registers and Modulo Counters).

UNIT V MEASUREMENTS & INSTRUMENTATION 9

Classification of instruments - Types of indicating Instruments – Construction and working; Induction Wattmeter, Ammeter (moving coil and moving iron type), Voltmeter (moving coil and moving iron type) – CRO – three-phase power measurements (Two wattmeter method) - Introduction to transducers (LVDT, RTD and Piezoelectric).

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After successful completion of the course, the students will be able to:

CO1 Solve simple dc circuits using basic electrical laws

CO2 Describe the construction and working principle of various DC and AC Machines.

CO3 Elucidate characteristics of various semiconductor devices used in electronic circuits.

CO4 Design simple digital circuits for various electronic applications.

CO5 Explain the construction and working of electrical measuring instruments and transducers.

TEXT BOOKS:

1. Muthusubramanian, R., Salivahanan, R. and Muraleedharan, K.A., 2009. *Basic Electrical & Electronics Engineering*. Tata McGraw Hill Education Private Limited.

REFERENCES:

1. Theraja, B.L., 2006. *Fundamentals of Electrical Engineering and Electronics in SI System of Units (including Rationalized MKSA System)*. Chand.
2. Bird, J., 2014. *Electrical circuit theory and technology*. Routledge.
3. AlMorris, A.S. and Langari, R., 2012. *Measurement and instrumentation: theory and application*. Academic Press.
4. Prasad, R., 2014. *Fundamentals of Electrical Engineering*. PHI Learning Pvt. Ltd.

IT1311 OBJECT ORIENTED PROGRAMMING LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVES:

This course enables the students to

- build software development skills using JAVA programming for real-world applications
- understand and apply the OOPs concepts like inheritance, interfaces
- handle the exceptions that arise in JAVA applications
- apply the concepts of event driven programming and JDBC to store and retrieve data from database
- develop applications using generic programming and multithreading

LIST OF EXPERIMENTS:

1. **Implementation of Basic Java programs**
    a. Make use of appropriate control statements
        i. To perform linear search
        ii. To perform matrix operations
        iii. To generate prime numbers
        iv. Pattern printing – Floyd's triangle
    b. Build a user defined classes and object
    c. Develop a Java application to generate Electricity bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading, type of EB connection (i.e domestic or commercial). Compute the bill amount using the following tariff.

i. If the type of the EB connection is domestic, calculate the amount to be paid as follows:
    - First 100 units – Rs. 1 per unit
    - 101-200 units – Rs. 2.50 per unit
    - 201 -500 units – Rs. 4 per unit
    - > 501 units – Rs. 6 per unit

ii. If the type of the EB connection is commercial, calculate the amount to be paid as follows:
    - First 100 units – Rs. 2 per unit
    - 101-200 units – Rs. 4.50 per unit
    - 201 -500 units – Rs. 6 per unit
    - > 501 units – Rs. 7 per unit

2. Implementation of user defined Packages.

a. Develop a Java application to implement currency converter (Dollar to INR, EURO to INR, Yen to INR and vice versa), distance converter (meter to KM, miles to KM and vice versa) , time converter (hours to minutes, seconds and vice versa) using packages.

3. Implementation of Inheritance concepts

a. Develop a Java application with Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club fund. Generate pay slips for the employees with their gross and net salary.

4. Implementation of Interfaces concept

a. Design a Java interface for ADT Stack. Implement this interface using array. Provide necessary exception handling in both the implementations.

5. Implement a Java program that make use of Non access modifiers

a. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named print Area().
    - Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape.
    - Each one of the classes contains only the method print Area () that prints the area of the given shape.

6. **Implement a Java program using various Exception handling**
    a. Write a Java program to use exception handlers
7. **Files and IO streams.**
    a. Write a Java program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.
8. **Implementation of JDBC**
    a. Make use of Q1.c. Create a table that contains cid, cname, address, date_of_payment, previous_month_reading, current_month_reading, connection_type, amount. Perform the following operations:
        i. Insert the electricity meter reading units details of customer
        ii. Display the details of the customer of the type Domestic and commercial
        iii. Update the address of the specific customer
        iv. Delete the details of a specific customer
        v. Display the total bill amount generated in a specific duration
        vi. Display the details of the customer who is paying highest amount
9. **Implement a real time application using Event driven program**
    a. Design a calculator using Event-driven programming paradigm of Java with the following options.
        i. Decimal manipulations
        ii. Scientific manipulations
10. **Implementation of Generics programming**
    a. Write a Java program to find the maximum value from the given type of elements using a generic function.
11. **Utilize the appropriate Collection framework for any real time application**
    a. Write a program to perform string operations using ArrayList. Write functions for the following
        i. Append
        ii. Insert
        iii. Search
        iv. List all string starts with given letter
12. **Implementation of Multithreading programming**
    a. Write a java program that implements a multi-threaded application that has three threads.

i. First thread generates a random integer every 1 second and if the value is even
ii. Second thread computes the square of the number and prints. If the value is odd
iii. Third thread will print the value of cube of the number.

13. Mini project

TOTAL: 60 PERIODS

SOFTWARE SPECIFICATIONS:

1. JDK8
2. Eclipse / Netbean
3. MySQL

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1	Develop JAVA applications using Fundamental Programming Structures
CO2	Make use of the OOPs features to implement various JAVA applications
CO3	Apply the exception handling mechanism to handle the exceptions that arise in JAVA applications
CO4	Build Java application using event driven programming and JDBC concepts
CO5	Utilize Generics programming and Multithreaded programming for developing JAVA applications

REFERENCES

1 Herbert Schildt, *"Java: The Complete Reference*", Eleventh Edition, McGraw Hill Education, 2014.
2 https://www.eclipse.org/
3 https://netbeans.org/

EC1316 DIGITAL SYSTEMS LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVES:

This course enables the students to

- understand the various basic logic gates.
- design and implement the various combinational circuits
- design and implement combinational circuits using MSI devices
- design and implement sequential circuits
- understand and code with HDL programming

LIST OF EXPERIMENTS:

1. Verification of Boolean Theorems using basic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters.
3. Design and implement Half/Full Adder and Subtractor.
4. Design and implement combinational circuits using MSI devices:
   - 4–bit binary adder / subtractor
   - Parity generator / checker
   - Magnitude Comparator
   - Application using multiplexers and demultiplexers.
5. Design and implement shift-registers.
6. Design and implement synchronous counters.
7. Design and implement asynchronous counters.
8. Coding combinational circuits using HDL.
9. Coding sequential circuits using HDL.
10. Design and implementation of a simple digital system (Mini Project).

TOTAL: 60 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Experiment with the basics of gates.

CO2 Build different combinational circuits.

CO3 Construct various sequential circuits.

CO4 Model combinational & Sequential circuits using HDL.

CO5 Make use of the concepts for implementation of a simple digital system.

EE1282 FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

(Common to CIVIL, MECH & IT)

L	T	P	C
0	0	4	2

OBJECTIVES:

This course enables the students to

- give practical exposure to students on various electrical and electronics components.
- perform standard tests on basic electrical machines used in domestic and industrial applications.
- give hands-on practice on design and simulation of simple analog and digital circuits.

LIST OF EXPERIMENTS:

1. Verification of Ohm's Law & Kirchhoff's Laws.
2. Load test on separately excited DC generator.
3. Load test on DC Shunt Motor.
4. Load test on Single phase Transformer.
5. Load test on Single phase Induction motor.
6. Characteristics of PN Junction Diode.
7. Characteristics of BJT (CE Configuration).
8. Study of Logic gates.
9. Verification of Half adder and Full adder.
10. Study of CRO and measurement of AC signals.
11. Measurement of three-phase power using Digital Power meter and two wattmeter method.
12. Characteristics of LVDT and RTD.

TOTAL: 60 PERIODS

COURSE OUTCOMES

Upon successful completion of course the students will be able to

CO1 Demonstrate load test to determine the performance characteristics of various AC & DC Machines.

CO2 Analyze the characteristics of semiconductor devices.

CO3 Design simple digital logic circuits.

CO4 Illustrate the performance of various measuring instruments & transducers.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

S. No.	NAME OF THE EQUIPMENT	QUANTITY
1.	D. C. Motor Generator Set	2
2.	D.C. Shunt Motor	2
3.	Single Phase Transformer	2
4.	Single Phase Induction Motor	2
5.	Ammeter AC and DC	20
6.	Voltmeters AC and DC	20
7.	Watt meters LPF and UPF	4
8.	Resistors & Breadboards	-
9.	Cathode Ray Oscilloscopes	4
10.	Dual Regulated power supplies	6
11.	A.C. Signal Generators	4
12.	Transistors (BJT, JFET)	-

HS1321 INTERPERSONAL SKILLS - LISTENING AND SPEAKING

L	T	P	C
0	0	2	1

OBJECTIVES:

The course will enable learners to

- Equip students with the English language skills required for the successful undertaking of academic studies with primary emphasis on academic speaking and listening skills.
- Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
- Improve general and academic listening skills
- Make effective presentations

UNIT I LISTENING AS A KEY SKILL 6

Listening as a key skill- its importance- speaking – give personal information – ask for personal information – express ability – enquire about ability – ask for clarification - Improving pronunciation– pronunciation basics –– stressing syllables and speaking clearly – intonation patterns – conversation starters: small talk.

UNIT II LISTEN TO A PROCESS INFORMATION 6

Listen to a process information- give information, as part of a simple explanation –– taking lecture notes – preparing to listen to a lecture – articulate a complete idea as opposed to producing fragmented utterances - compare and contrast information and ideas from multiple sources- converse with reasonable accuracy over a wide range of everyday topics

UNIT III LEXICAL CHUNKING 6

Lexical chunking for accuracy and fluency- factors influence fluency, deliver a five-minute informal talk – greet – respond to greetings – describe health and symptoms – invite and offer – accept – decline – take leave – listen for and follow the gist- listen for detail

UNIT IV GROUP DISCUSSION 6

Being an active listener: giving verbal and non-verbal feedback – participating in a group discussion – summarizing academic readings and lectures conversational speech listening to and participating in conversations – persuade- negotiate disagreement in group work**.**

UNIT V GROUP & PAIR PRESENTATIONS 6

Formal and informal talk – listen to follow and respond to explanations, directions and instructions in academic and business contexts – strategies for presentations and interactive communication – group/pair presentations

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1 Develop their communicative competence in English with specific reference to listening

CO2 Prepare conversation with reasonable accuracy

CO3 Apply lexical Chunking for accuracy in speaking

CO4 Demonstrate their ability to communicate effectively in GDs.

CO5 Explain directions and instructions in academic and business contexts

TEXT BOOKS:

1. Brooks, Margret, 2011, *Skills for Success. Listening and Speaking. Level 4,* Oxford University Press, Oxford.
2. Richards, C, Jack& David Bholke, 2010, *Speak Now Level 3,* Oxford University Press, Oxford.

REFERENCES:

1. Bhatnagar, Nitin & Mamta Bhatnagar, 2010, *Communicative English for Engineers and Professionals,* Pearson, New Delhi.
2. Hughes, Glyn & Josephine Moate, 2014, *Practical English Classroom,* Oxford University Press, Oxford.
3. Vargo, Mari, 2013, *Speak Now Level 4*, Oxford University Press, Oxford.
4. Richards, C, Jack, 2006, *Person to Person (Starter)*, Oxford University Press, Oxford.
5. Ladousse, Gillian Porter, 2014, *Role Play*. Oxford University Press, Oxford.

WEB RESOURCES:

1. https://www.cambridge.org/elt/blog/wp-content/uploads/2019/10/Learning-Language-in-Chunks.pdf
2. https://english.eagetutor.com/english/628-how-to-greet-your-boss-people-in-office.html
3. https://www.groupdiscussionideas.com/group-discussion-topics-with-answers/
4. https://www.bbc.co.uk/worldservice/learningenglish/business/talkingbusiness/unit3presentations/1opening.shtml

SEMESTER IV

CS1371 DATABASE MANAGEMENT SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

To enable the students to

- learn the fundamentals of data models and to represent a database system using ER diagrams
- study SQL and relational database design
- understand the internal storage structures using different file and indexing techniques which will help in physical database design
- understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures
- learn about file organization and query processing

UNIT I INTRODUCTION TO DATABASE & ER MODEL 9

Introduction to Databases - File System Vs Database System - Database System Architecture- Database Users and Administrator - Data Models - Entity Relationship Model - E-R Diagrams - Design Issues - Extended E-R Features - Introduction to Relational Model - ER to Relational Schema Mapping

UNIT II RELATIONAL MODEL & SQL 9

Structure of Relational Databases - Relational Query Languages - Relational Algebra – SQL: DDL, DML, DCL, TCL - Simple Queries, Complex Nested Queries, Correlated Nested Queries, Joins, Aggregate Functions, Grouping - PL/SQL : Functions, Procedures, Triggers, Views - Embedded SQL - Dynamic SQL

UNIT III NORMALIZATION 9

Pitfalls in Bad Relational database design - Functional Dependencies (Closure of Functional dependencies) - Closure of Attributes - Normal Forms : First, Second, Third, Boyce Codd Normal Form, Multivalued Dependencies : Fourth Normal Form, Join Dependencies : Fifth Normal Form –Domain Key Normal Form

UNIT IV TRANSACTION AND CONCURRENCY CONTROL 9

Transaction processing concepts - Need for concurrency control and recovery - Recoverability – Transaction Recovery – Serializability : Conflict Serializability, View Serializability, Testing for Serializability - Concurrency Control : Lock Based Protocols (Two phase locking Techniques, Strict Two Phase Locking, Deadlocks, Multiple Granularity) Timestamp Based protocol, Validation Based protocol

UNIT V FILE ORGANIZATION & QUERY PROCESSING 9

File Organization : Organization of Records in Files, Indexing and Hashing, Ordered Indices - Query Processing: Measures of Query Cost (Selection, Sorting and Join Operation), Query Tuning, Query Optimization (Transformation of Relational Expressions, Choice of Evaluation Plans, Materialized Views) – No SQL – Mongo DB.

TOTAL: 45 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Infer the basic concepts of database system and model ER diagram for real time applications.

CO2 Use appropriate SQL commands to store and access data from Relational Database.

CO3 Construct normalized database for real world scenario using functional dependencies.

CO4 Illustrate the importance of concurrency control in transaction to maintain consistency in a database.

CO5 Interpret the mechanisms incorporated in file organization and Query

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, *Database System Concepts*, 6th edition, Tata McGraw Hill. 2017.
2. RamezElmasri, Shamkant B. Navathe, *Fundamentals of Database Systems,* 6th edition, Pearson Education, 2011.

REFERENCES BOOKS

1. C.J. Date, A. Kannan& S. Swamynathan, *An Introduction to Database Systems,* 8th edition, Pearson Education, 2006.

2. Raghu Ramakrishnan, *Database Management Systems*, 4th edition, McGraw-Hill College Publications, 2015.
3. G.K.Gupta, *Database Management Systems*, Tata McGraw Hill, 2011.

IT1401 DATA STRUCTURES

L	T	P	C
3	0	0	3

OBJECTIVES:

This course enables the students to

- understand the concepts ofADTs
- Learn linear data structures – lists, stacks, andqueues
- apply Tree and Graphstructures
- understand sorting, searching and hashingalgorithms

UNIT I LINEAR DATA STRUCTURES - LIST 9

ADTs- List - Array & Singly linked list: Polynomial Manipulation, Merging of Two lists - Doubly linked list: Palindrome Checking - Circular linked list: Round Robin Scheduling, Josephus Problem.

UNIT II LINEAR DATA STRUCTURES - STACKS, QUEUES 9

Stack - Polish Form : Infix to Postfix, Evaluation of Postfix - Parenthesis Checking- Palindrome Checking- Recursion Avoidance – Queue- FIFO Scheduling- Deque- Priority Queue: Priority Based Scheduling.

UNIT III NON LINEAR DATA STRUCTURES - TREES 9

Trees - Binary Search Tree: Traversal - AVL Tree - B Tree - B+ Trees - Heap

UNIT IV NON LINEAR DATA STRUCTURES - GRAPHS 9

Graphs – Traversal: BFS, DFS - Minimum Path: Dijkstra's - Spanning Tree: Prims,Kruskal - Bi-connectivity & Cut vertices - Topological Sort - Euler's Tour

UNIT V SEARCHING, SORTING AND HASHING TECHNIQUES 9

Searching: Linear Searching, Binary Searching – Sorting : Bubble Sort - Insertion Sort - Selection Sort - Shell Sort - Radix Sort - Indexing – Hashing: Closed Hash, Open hash, Collision Avoidance: Linear, Quadratic, Double Hashing – Rehashing - Extendible Hashing

TOTAL: 45 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Utilize an appropriate linear data structure to provide solution for real life scenario

CO2 Make use of Stack and Queue ADTs for problem solving.

CO3 Illustrate the structural properties and operations on various types of Tree ADTs in balanced search.

CO4 Select an appropriate graph algorithms to solve real life problems.

CO5 Choose an appropriate sorting, searching or indexing strategy for effective data storage and retrieval.

TEXT BOOKS:

1. Horowitz &Sahni, *Fundamentals of Data Structures in C,* 2ndedition, Orient Publication, 2008.

2. Aho, Hopcroft& Ullman, *Data Structures and Algorithms,* Addison Wesley., 1983.

REFERENCES:

1.Aaron M. Tenenbaum, YedidyahLangsam& Moshe J. Augenstein, *Data Structures Using C and C++,* PHI Publications, 2006.

2.Jean Paul Trembley& Paul G. Sorenson, 2017, *An Introduction to Data Structures with applications,* 2nd edition, McGraw Hill Publications

3. Mark Allen Weiss, *Data Structures and Algorithm Analysis In C,* 2nd edition, Addison-Wesley, 2002.

IT1402 OPERATING SYSTEMS

L	T	P	C
3	0	0	3

OBJECTIVES:

This course enables the students to:

- Acquire basic knowledge on operating system structures and its functions
- Study the concept of process management and deadlock
- Learn the basics of memory management and its techniques

- Understand the structure of file, Directory and I/O systems
- Familiar with some operating systems

UNIT I INTRODUCTION 9

Introduction to Operating Systems - Computer System Organization - Architecture - Evolution of Operating System - Operating System Structure - Operations - Process, Memory, Storage Management - Protection and Security - Distributed Systems - OS Services - User interface - System Calls - System Programs - Process Concept - Scheduling - Operations on Processes - Cooperating Processes - Inter process Communication - Threads

UNIT II PROCESS MANAGEMENT 10

Scheduling : Scheduling Criteria - Scheduling Algorithms - Multiple Processor Scheduling - Algorithm Evaluation - The Critical Section Problem - Synchronization Hardware - Semaphores - Classic Problems of Synchronization - Critical Regions - Monitors - Deadlocks - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance - Deadlock detection and Recovery

UNIT III MEMORY MANAGEMENT 9

Introduction - Swapping - Contiguous Memory Allocation - Paging - Segmentation - Segmentation with Paging - Virtual Memory: Background - Demand Paging - Page Replacement - Allocation of Frames - Thrashing

UNIT IV FILE AND I/O SYSTEMS 8

File Concept - Access Methods - Directory Structure - File System Mounting - Protection - Directory Implementation - Allocation Methods - Free Space Management - Disk Scheduling - Disk Management - Swap Space Management - Protection. I/O Systems: I/O Hardware - Application I/O Interface - Kernel I/O Subsystem.

UNIT V CASE STUDY 9

The Linux System: History - Design Principles - Kernel Modules - Process Management Scheduling - Memory management - File systems - Input and output - Inter Process Communication - Mobile OS - iOS and Android - Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, File System.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

After successful completion of the course, the students will be able to:

CO1 Elucidate the evolution of operating system along with its structure and functions

CO2 Demonstrate the various process management algorithms

CO3 Illustrate the performance of various memory management techniques

CO4 Describe file, Directory system and I/O Management techniques

CO5 Summarize some popular operating systems like Linux, Mobile OS like iOS and Android

TEXTBOOK:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts,* John Wiley & Sons Inc., 9th Edition, 2013

REFERENCE BOOKS:

1. Andrew S. Tanenbaum, *Modern Operating Systems*, Addison Wesley, Second Edition, 2001.

2. William Stallings*, Operating Systems: Internals and Design Principles,* Prentice Hall, Seventh Edition, 2011.

3. Charles Crowley, *Operating Systems: A Design-Oriented Approach,* Tata McGraw Hill Education, 1996.

4. D M Dhamdhere, *Operating Systems: A Concept-based Approach*, Tata McGraw-Hill Education, Second Edition, 2007.

5. Neil Smyth*, iPhone iOS 4 Development Essentials – Xcode,* Fourth Edition, Payload media, 2011.

6. Daniel P Bovet and Marco Cesati*, Understanding the Linux kernel,* 3rd edition, O'Reilly, 2005.

IT1403 SOFTWARE ENGINNERING

L	T	P	C
3	0	0	3

OBJECTIVES:

This course enables the students to

- Understand the phases in a software project development
- Learn how to elicit and formulate requirements
- Understand the various software design methodologies
- Learn various testing and maintenance measures

- Familiarize the activities in software project management

UNIT I SOFTWARE PROCESS MODELS 9

Introduction to software engineering – Software Process – Perspective Process Models: Waterfall Model – Incremental Process Models – Evolutionary Process Model – Concurrent Models. Specialized Process Models: Component-Based Development – Formal Methods Model – Aspect-Oriented Software Development. Agile Process Model: Introduction to Agility – Agile Process – Agile Manifesto and Principles – Extreme Programming – Scrum Process.

UNIT II REQUIREMENT ANALYSIS AND SPECIFICATION 9

Software Requirements: Functional Requirements – Non-Functional Requirements – User Requirements – System Requirements – Software Requirements Document. Requirement Engineering Process: Feasibility Studies – Requirements Elicitation and Analysis – Requirements Validation – Requirements Management – Requirements Modelling – Data Dictionary.

UNIT III SOFTWARE DESIGN 9

Design Process – Design Concepts – Design Model – Design Heuristic – Architectural Design: Architectural styles – Architectural Design – Mapping Data Flow and Transaction Flow into Software Architecture. User Interface Design: Interface Analysis – Interface Design. Component-Level Design: Designing Class-Based Components.

UNIT IV TESTING AND MAINTENANCE 9

Taxonomy of Software Testing – Types of Testing: Black Box Testing – White Box Testing – Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing – Debugging. Software Implementation Techniques: Coding Practices – Refactoring. Maintenance and Reengineering: BPR model – Reengineering Process Model – Reverse and Forward Engineering – Testing Tools.

UNIT V SOFTWARE PROJECT MANAGEMENT 9

Estimation: LOC – FP Based Estimation – Make/Buy Decision – COCOMO I & II Model. Project Scheduling: Project Scheduling – Scheduling – Earned Value Analysis. Project Planning: Project Plan – Planning Process. Risk Management: Software Risks – Risk Identification – Risk Projection – RMMM – RMMM Plan. Software Configuration Management: SCM Repository –

SCM Process – CASE TOOLS.

TOTAL: 45 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Compare and contrast the various Process Models to develop software projects.

CO2 Explain the concepts of requirement engineering and analysis modelling.

CO3 Illustrate the software design process and various types of design models.

CO4 Paraphrase the relevant coding standards, testing practices and Reengineering Process Model.

CO5 Outline the various activities involved in the software project management.

TEXT BOOKS:

1. Roger S. Pressman, *Software Engineering– A Practitioner's Approach*,Eightth Edition, McGraw-Hill International Edition,2015.
2. Ian Sommerville, *Software Engineering*,9th Edition, Pearson Education Asia,2011.

REFERENCES:

1. Rajib Mall, *Fundamentals of Software Engineering*, Third Edition, PHI Learning. PrivateLimited, 2009.
2. PankajJalote, *Software Engineering, A Precise Approach*, Wiley India, 2010.
3. Kelkar S.A., *Software Engineering*, Prentice Hall of India Pvt Ltd, 2007.
4. Stephen R.Schach, *Software Engineering*, Tata McGraw-Hill Publishing Company Limited, 2007.

EC1406 COMMUNICATION ENGINEERING

L	T	P	C
3	0	0	3

OBJECTIVES:

- To understand analog communication techniques.
- To learn data and pulse communication techniques
- To understand digital communication techniques

- To be familiarized with source and Error control coding.
- To gain knowledge on multi-user radio communication.

UNIT I ANALOG COMMUNICATION 9

Introduction to Communication Systems - Modulation – Types - Need for Modulation. Theory of Amplitude Modulation – DSB-SC,SSB,VSB Techniques – FM Direct, Indirect method - Phase Modulation – Comparison of Analog Communication Systems (AM – FM – PM).

UNIT II PULSE AND DATA COMMUNICATION 9

Pulse Communication: Pulse Amplitude Modulation (PAM) – Pulse Time Modulation (PTM) – Pulse code Modulation (PCM) –DM, ADM. Data Communication: History of Data Communication - Standards Organizations for Data Communication- Data Communication Circuits - Data Communication Codes - Data communication Hardware - serial and parallel interfaces.

UNIT III DIGITAL COMMUNICATION 9

Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK)–Phase Shift Keying (PSK) – BPSK – QPSK – Quadrature Amplitude Modulation (QAM) – 8 QAM – Bandwidth Efficiency– Comparison of various Digital Communication System (ASK – FSK – PSK – QAM).

UNIT IV SOURCE AND ERROR CONTROL CODING 9

Entropy, Source encoding theorem, Shannon fano coding, Huffman coding, mutual information, channel capacity, Error Control Coding, linear block codes, cyclic codes - ARQ Techniques.

UNIT V MULTI-USER RADIO COMMUNICATION 9

Global System for Mobile Communications (GSM) - Code division multiple access (CDMA) – Cellular Concept and Frequency Reuse - Channel Assignment and Handover Techniques - Overview of Multiple Access Schemes - Satellite Communication applications- Bluetooth.

TOTAL: 45 PERIODS

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Explain the different analog communication techniques and their comparison.

CO2 Interpret various pulse communication systems with the fundamentals of data

communication for serial and parallel interface.

CO3 Compare the different types of digital communication methods used for high bit rate transmission.

CO4 Explain the concepts of source, error control and block coding techniques for enhancing the rating of transmission and minimizing the errors in transmission.

CO5 Illustrate the various radio communication medium like GSM, CDMA, Satellite communication and Bluetooth for enhancing the number of users.

TEXT BOOKS

1. WayneTomasi2009,*Advanced Electronic Communication Systems*, 6th Edition, Pearson Education.

REFERENCE BOOKS

1. Simon Haykin 2004, *Communication Systems*, 4th Edition, John Wiley & Sons.

2. Rappaport T.S 2007, *Wireless Communications: Principles and Practice*, 2nd Edition, Pearson Education.

3. H.Taub, D L Schilling and G Saha 2007, *Principles of Communication*, 3rd Edition, Pearson Education.

4. B. P.Lathi 2007, *Modern Analog and Digital Communication System*, 3rd Edition, Oxford University Press.

5. Blake 2002, *Electronic Communication Systems*, Thomson Delmar Publications.

6. Martin S.Roden 2002, *Analog and Digital Communication System*, 3rd Edition, Prentice Hall of India.

7. B.Sklar 2007, *Digital Communication Fundamentals and Applications*, 2nd Edition Pearson Education.

CS1381 DATABASE MANAGEMENT SYSTEMS LAB

L	T	P	C
0	0	4	2

OBJECTIVES:

To enable the students to

- learn the commands for creating and manipulating the databases
- construct queries for retrieval of required data from database
- understand views, sequences and synonyms concepts of SQL

- learn the functions, procedures, triggers and exception handling in SQL
- develop GUI based application for storage and retrieval of data

LIST OF EXPERIMENTS:

1. **WRITE AND EXECUTE SIMPLE QUERIES USING SQL**
    a. DDL, TCL and DCL commands
    b. DML commands
    c. Aggregate Functions
2. **WRITE AND EXECUTE ADVANCED QUERIES USING SQL**
    a. Nested Queries and Sub queries
    b. SQL Join
3. **WRITE AND EXECUTE VIEWS, SYNONYMS, SEQUENCE**
4. **WRITE AND EXECUTE QUERIES USING PL/SQL**
    a. Simple programs
5. **WRITE AND EXECUTE QUERIES USING ADVANCED CONCEPTS OF PL/SQL**
    a. Cursors and Procedures
    b. Functions
    c. Triggers
    d. Exception Handling
6. **IMPLEMENT DATABASE CONNECTIVITY CONCEPTS**
    a. Design a Front End for a real time application
    b. Connect the database with the application
7. **MINI PROJECT**

TOTAL: 60 PERIODS

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

S. No.	Description of Equipment	Quantity Required
1.	Personal Computers (Intel Core i3, HDD 500 GB, 4 GB RAM)	30
2.	Printer	1
3.	Software: XAMPP with Apache, MySQL & PHP (or)	Open source

	MySQL & JAVA.	

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Choose appropriate DDL, DML, DCL and TCL commands for creating and manipulating the databases..

CO2 Construct appropriate nested queries, sub queries and join queries for efficient retrieval of data.

CO3 Organize database using views, sequences, and synonyms.

CO4 Implement functions, procedures, triggers and exceptions using PL/SQL.

CO5 Develop a GUI based environment for storage and retrieval of data for a real time application.

REFERENCES

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, *Database System Concepts*, 6th edition, Tata McGraw Hill, 2017.
2. RamezElmasri, Shamkant B. Navathe*, "Fundamentals of Database Systems"*, 6th edition, Pearson Education, 2011.

IT1411 DATA STRUCTURESLABORATORY

L	T	P	C
0	0	4	2

OBJECTIVES:

This course enables the students to

- implement linear and non-linear datastructures
- understand the different operations of searchtrees
- implement graph traversalalgorithms
- get familiarized to sorting and searchingalgorithms

LIST OF EXPERIMENTS:

1. Array implementation of List ADT
2. Linked implementation of List ADT
    a. Singly Linked List -Merging of Two Lists

b. Circular Linked List - Josephus Problem

c. Doubly Linked List - Palindrome Checking

3. Array implementation of Stack and Queue ADTs
4. Linked list implementation of Stack and Queue ADTs
5. Applications of Stack ADT - Implementation and evaluation of Polish Form
6. Applications of Queue ADT - Implementation of Deque
7. Implementation of Binary Search Trees
8. Implementation of AVL Trees
9. Implementation of Heaps using Priority Queues
10. Graph Representation and Traversal Algorithms
    a. Adjacency Matrix Representation
    b. Adjacency List Representation
11. Applications of Graphs - Single Source Shortest Path
12. Implementation of Searching Algorithms
    a. Linear Search
    b. Binary Search
13. Implementation of Sorting Algorithms
    a. Bubble Sort
    b. Insertion Sort
    c. Selection Sort
    d. Shell Sort
    e. Radix Sort
14. Implementation of Hashing Techniques: Open Hashing
    a. Linear Probing
    b. Quadratic Probing

TOTAL: 60 PERIODS

SOFTWARE SPECIFICATIONS:

1. C Compiler

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Implement linear data structures - Array, List, Stack and Queue ADTs for problem solving

CO2 Implement non-linear, hierarchical data structure - Trees for problem solving

CO3 Implement non-linear, non-hierarchical data structure - Graph for problem solving

CO4 Implement various Searching and Sorting Algorithms

CO5 Apply appropriate hash functions in a hash ADT to facilitate collision free data storage and retrieval

REFERENCES:

1. Horowitz &Sahni, *Fundamentals of Data Structures in C,* 2nd edition, Orient Publication, 2008.

2. Aho, Hopcroft& Ullman, *Data Structures and Algorithms*, Addison Wesley, 1983.

IT1412 OPERATING SYSTEMS LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVES:

This course enables the students to

- Practice basic commands of operating systems ,execute system calls of UNIX operating system and practice basic shell programming
- Implement process synchronization mechanisms in operating systems
- Learn various process management schemes in operating systems
- Practice with different memory management mechanisms
- Implement the file allocation techniques

LIST OF EXPERIMENTS

1. **Unix Commands**
   a. Basics of UNIX commands
2. **System Calls - Commands and Implementation Using C**
   a. Write programs using the following system calls of UNIX operating system fork, exec, getpid, exit, wait, close, stat, opendir, readdir
   b. Write C programs to simulate UNIX commands like cp, ls, grep, etc.
3. **Shell Programming**

a. Shell Programming

4. CPU Scheduling

a. Write C programs to implement the various CPU Scheduling Algorithms

5. IPC - Semaphores, Shared Memory

a. Implementation of Semaphores

b. Implementation of Shared memory and IPC

6. Deadlock Detection and Avoidance

a. Bankers Algorithm for Deadlock Avoidance

b. Implementation of Deadlock Detection Algorithm

7. Threading and Its Synchronization

a. Implementation of Threading & Synchronization Applications

8. Memory Allocation Methods

a. Implementation of the following Memory Allocation Methods for fixed partition

i) First Fit ii) Worst Fit iii) Best Fit

b. Implementation of Paging Technique of Memory Management

9. Page Replacement Algorithms

a. Implementation of the following Page Replacement Algorithms

i) FIFO ii) LRU iii) LFU

10. File Allocation and Organization Techniques

a. Implementation of the various File Organization Techniques

b. Implementation of the following File Allocation Strategies

i) Sequential ii) Indexed iii) Linked

TOTAL: 60 PERIODS

SOFTWARE SPECIFICATIONS:

1. Linux Operating System
2. CC / GCC Compiler

COURSE OUTCOMES

After successful completion of the course, the students will be able to:

CO1 Practice UNIX commands, system calls and write shell scripts involving selection and loops

CO2 Create processes and implements inter process communication with synchronization

CO3 Execute various CPU scheduling algorithms

CO4 Implement deadlock avoidance and detection algorithms

CO5 Illustrate various memory allocation methods, page replacement algorithms, file allocation and organization techniques

REFERENCES:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts Essentials*, John Wiley & Sons Inc., 10th Edition, 2018
2. Andrew S. Tanenbaum, *Modern Operating Systems*, Addison Wesley, Second Edition, 2001.

HS1421 AN INTRODUCTION TO ADVANCED READING AND WRITING

OBJECTIVES:

L	T	P	C
0	0	2	1

The course will enable learners to

- To strengthen the reading skills of students of engineering.
- To enhance their writing skills with specific reference to technical writing
- To develop their critical thinking skills.
- To provide more opportunities to develop their project and proposal writing skills

UNIT I EFFECTIVE READING 6

Reading – Strategies for effective reading-Use glosses and footnotes to aid reading comprehension- Read and recognize different text types-Predicting content using photos and title. Reading-Read for details-Use of graphic organizers to review and aid comprehension.

UNIT II CRITICAL READING 6

Reading– Understanding pronoun reference and use of connectors in a passage- speed reading techniques. Reading– Genre and Organization of Ideas- Reading– Critical reading and thinking-understanding how the text positions the reader.

UNIT III PARAGRAPH WRITING 6

Writing-Plan before writing- Develop a paragraph: topic sentence, supporting sentences, concluding sentence.-Write a descriptive paragraph Writing-State reasons and examples to support ideas in writing– Write a paragraph with reasons and examples- Write an opinion paragraph

UNIT IV ESSAY WRITING 6

Writing– Elements of a good essay - Types of essays- descriptive-narrative- issue-based-argumentative-analytical.

UNIT V EFFECTIVE WRITING 6

Writing– Email writing- visumes – Job application- Report Writing - Project writing-Writing convincing proposals

TOTAL: 30 PERIODS

COURSE OUTCOMES:

CO1 Understand how the text positions the reader

CO2 Develop critical thinking while reading a text

CO3 Develop a descriptive paragraph

CO4 Make use of sentence structures effectively when creating an essay

CO5 Demonstrate proper usage of grammar in writing E-Mails, Job application and project proposals

TEXT BOOKS:

1. Gramer, F, Margot & Colin, S, Ward, 2011, *Reading and Writing (Level 3)* Oxford University Press, Oxford.

2. Debra Daise, CharlNorloff, and Paul Carne, 2011, *Reading and Writing (Level 4)* Oxford University Press: Oxford.

REFERENCE BOOKS:

1. Davis, Jason & Rhonda LIss. 2006 *Effective Academic Writing (Level 3)* Oxford University Press: Oxford.

2. E. Suresh Kumar and et al. 2012*, Enriching Speaking and Writing Skills,* Second Edition, Orient Black swan: Hyderabad.

3. Withrow, Jeans and et al. 2004 *Inspired to Write. Readings and Tasks to develop writing skills,* Cambridge University Press: Cambridge.

4. Goatly, Andrew, 2000 *Critical Reading and Writing*, Routledge: United States of America.

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