Ref: UPL University /SRICT/BOS/CO/2024-25/01
Date: 06-02-2024

Teaching Scheme for
Second Year Diploma in Information Technology

Semester-III (Information Technology) Structure

Sr. No	Category of Course	Code No.	Course Title	Hours per week			Total contact hrs/ week	Credits	E	M	I	V	Total
				L	T	P							
1	Program core course	CO1201	Object Oriented Programming	2	0	2	4	3	70	30	20	30	150
2	Program core course	CO1202	Operating System	3	0	2	5	4	70	30	20	30	150
3	Program core course	CO1203	Data Structure	3	0	2	5	4	70	30	20	30	150
4	Program core course	CO1204	Database Management System	3	0	2	5	4	70	30	20	30	150
5	Program core course	IT1201	Digital Logic Design	3	0	0	3	3	70	30	0	0	100
6	Humanities and Social Science course	MH1201	Communication Skills in English	3	0	2	5	4	70	30	20	30	150
7	Audit course - Essence of Indian Traditional Knowledge	MH1202	Essence of Indian Traditional Knowledge	1	0	0	1	0	0	0	20	30	50
8	Inplant Training	MH1203	Inplant Training	0	0	0	0	1	0	0	50	0	50
	Total			**18**	**0**	**10**	**28**	**23**	**Total**				**950**

Semester-IV (Information Technology) Structure

Sr. No	Category of Course	Code No.	Course Title	Hours per week			Total contact hrs / week	Credits	E	M	I	V	Total
				L	T	P							
1	Program core course	CO1206	Algorithm	2	0	2	4	3	70	30	20	30	150
2	Program core course	IT1202	Data Communication & Networks	3	0	2	5	4	70	30	20	30	150
3	Program core course	IT1203	Web Designing & Development	3	0	2	5	4	70	30	20	30	150
4	Program core course	CO1209	JAVA Programming	3	0	2	5	4	70	30	20	30	150
5	Program Elective course		Program Elective1	3	1	0	4	4	70	30	50	0	150
6	Open Elective		Open Elective 1	3	0	0	3	3	70	30	0	0	100
	Total			**17**	**1**	**8**	**26**	**22**	**Total**				**850**

Sr No	Program Elective 1	Open Elective 1
1	IT1204 – Fundamentals of Software Development	CO1212 - Cyber Security
2	CO1211 -Information Security	CO1213 - Soft Computing

A. Course code and definition:

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
E	Theory External Examination Marks
M	Theory Internal Examination Marks
I	Practical Internal Examination Marks
V	Practical External Examination Marks

Diploma in Engineering
Subject Code: CO1201
Subject Name: Object Oriented Programming

Semester: - III

Type of course: Engineering Core

Prerequisite: Knowledge of Computer.

Rationale: The OOP is all about creating objects that can interact with each other, this makes it easier to develop programs in OOP as we can understand the relationship between them.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	20	30	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Concepts of OOP** Introduction OOP, Procedural Vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP.	3
2	**C++ Basics** Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures.	3
3	**C++ Functions** Simple functions Call and Return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments, friend functions, and virtual functions.	5

Diploma in Engineering
Subject Code: CO1201
Subject Name: Object Oriented Programming

	SECTION-B	
4	**Inheritance** Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class.	**4**
5	**Polymorphism** Pointers in C++, Pointers and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism.	**4**
6	**Objects and Classes** Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, type conversion.	**5**

Text Book:

1. The complete reference C – by Herbert shieldt Tata McGraw Hill Publication.
2. Object Oriented Programming in C++ Saurav Sahay Oxford University Press.
3. Object Oriented Programming in C++ R Rajaram New Age International Publishers 2nd .
4. OOPS C++ Big C++ Cay Horstmann Wiley Publication.

Reference Books:

1. Herbert Schildt C++: Complete Reference (TMH).
2. Bjarne Stroustrupe C++ Programming Language (Addison-Wesley).
3. Venugopal Mastering C++. (TMH).
4. Lipmann C++ Primer (Addison-Wesley).
5. Savitch: Problem Solving using C++ (AddisonWesley) Low- Priced Edition.

Practical List :

1. Write C++ program to display week day's index number.
2. Problems involving control structures
    a. Write C++ program to find addition of 1 to 20 numbers.

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Subject Code: CO1201
Subject Name: Object Oriented Programming

b. Write C++ program to calculate addition, subtraction, multiplication, division of two numbers .

3. Write C++ program for implementing friend function.
4. Write a C++ program to find out the payroll system using single inheritance.
5. Write a C++ program for multiplication of two numbers using multiple inheritances.
6. Write a C++ program for calculating students' total marks and percentage using multilevel inheritance.
7. Write a C++ program for implementing this pointer.
8. Write a C++ program to demonstrate the working of virtual base class.
9. Write a C++ program for following :
   a. Display person's id, name and salary using this pointer.
   b. Addition of 3 numbers using function overloading.
   c. Implement concept of virtual function –Take Parent class as animal and subclasses as dog and cat.
10. Write a C++ program to calculate prime number using default, copy and parameterized constructor of class

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Define** concept of object oriented programming with examples.
CO-2	**Explain** basic concept of object oriented programming using variables and operators.
CO-3	**Learn** various functions theoretically.
CO-4	**Implement** inheritance concept with the help of practical.
CO-5	**Design** concept of pointers and objects using polymorphism.
CO-6	**Illustrate** various types of constructors and destructors.

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1202
Subject Name: Operating System

Semester: - III

Type of course: Engineering Core

Prerequisite: Knowledge of Computer

Rationale:
A general introduction to various ideas in implementation of operating systems, particularly UNIX. Introduce to various options available so as to develop capacity to compare, contrast, and evaluate the key trade-offs between different designs choices.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Overview** of Operating System, basic concepts, UNIX/LINUX Architecture, Kernel, services and systems calls, system programs.	5
2	**Process Management:** Process concepts, operations on processes, IPC, Process Scheduling, Multithreaded programming	8
3	**Memory management:** Memory allocation, Swapping, Paging, Segmentation, Virtual Memory, various faults.	6
	SECTION-B	
4	**File management:** Concept of a file, access methods, directory structure, file system mounting, file sharing and protection, file system structure and implementation, directory implementation, freespace management, efficiency and performance. Different types of file systems.	7

Diploma in Engineering
Subject Code: CO1202
Subject Name: Operating System

5	**I/O System:** Mass storage structure - overview, disk structure, disk attachment, disk scheduling algorithms, swap space management, RAID types.	**6**
6	**OS Security:** Authentication, Access Control, Access Rights, System Logs.	**4**

Practical List :

1. Revision practice of various commands like man, cp, mv, ln, rm, unlink, mkdir, rmdir, etc and many more that were learnt in IT Workshop course and later.
2. Use of Linux/Unix as a web server.
3. Implement message queue form of IPC
4. Implement shared memory and semaphore form of IPC
5. Simulate the CPU scheduling algorithms - Round Robin, SJF, FCFS, priority
6. Simulate Bankers algorithm for Deadlock Avoidance and Prevention
7. Simulate all FIFO Page Replacement Algorithm using C program
8. Simulate all LRU Page Replacement Algorithms using C program
9. Simulate Paging Technique of Memory Management
10. Practice various commands/utilities such as catnl, uniq, tee, pg, comm, cmp, diff, tr, tar, cpio, mount, umount, find, umask, ulimit, sort, grep, egrep,fgrep cut, paste, join, du, df ,ps, who, etc and many more.

Text Books:

1. Operating System Concepts – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 8th edition, Wiley-India, 2009.
2. Modern Operating Systems – Andrew S. Tanenbaum, 3rd Edition, PHI
3. Operating Systems: A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition

Reference Books:

1. Operating System Concepts, Silberschatz and Galvin, Wiley India Limited.
2. UNIX Concepts and Applications, Sumitabha Das, McGraw-Hill Education.
3. Operating Systems, Internals and Design Principles, Stallings, Pearson Education, India.
4. Modern Operating Systems, Andrew S. Tanenbaum, Prentice Hall of India.

Diploma in Engineering
Subject Code: CO1202
Subject Name: Operating System

5. Operating systems, Deitel & Deitel, Pearson Education, India.

Sr. No.	CO statement
CO-1	**Define** concept of various operating system with their architecture.
CO-2	**Construct** process management, multithreading, memory management.
CO-3	**Understand** concept of memory and virtual memory.
CO-4	**Explain** the concept file management with architecture and free space.
CO-5	**Design** various disk scheduling algorithms and represent it by algorithm,
CO-6	**Prepare** the operating system security issues.

Diploma in Engineering
Subject Code: CO1203
Subject Name: Data Structure

Semester: - III

Type of course: Engineering Science

Prerequisite: Knowledge of Computer

Rationale: To provide strong foundation for implementing programming language to formulate, analyze and develop solutions related to various data structure problems.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Data Structures:** Basic Terminology, Classification of Data Structures, Operations on Data Structures.	4
2	**Linear Data Structures**: Stacks: Introduction to Stacks, Array Representation of Stacks, Operations on a Stack, Applications of Stacks-Infix-to-Postfix Transformation, evaluating Postfix Expressions.	7
3	**Queues:** Introduction to Queues, Array Representation of Queues, Operations on a Queue, Types of Queues-DeQueue, Circular Queue, Applications of Queues-Round Robin Algorithm.	7
	SECTION-B	

Diploma in Engineering
Subject Code: CO1203
Subject Name: Data Structure

4	**Linked Lists:** Singly Linked List, Representation in Memory, Operations on a Single Linked List, Circular Linked Lists, Doubly Linked Lists, Linked List Representation and Operations of Stack, Linked list representation and operations of queue.	**5**
5	**Non Linear Data Structures** - Trees: Basic Terminologies, Definition and Concepts of Binary Trees, Representations of a Binary Tree using Arrays and Linked Lists, Operations on a Binary Tree-Insertion, deletion, Type of Binary Tree. **Graphs:** Graph Terminologies, Representation of Graphs- Set, Linked, Matrix, Graph Traversals	**7**
6	**Binary tree** -Representation in memory Binary Search Trees: Searching, Inserting, Deletion and Traversals using Stacks. Balanced Binary Trees: AVL Search Trees.	**6**

Text Book:

1. Data Structures A Psedocode Approach with C, Richard F. Gilberg & Behrouz A. Forouzan, second edition, CENGAGE Learning.
2. Data Structures using C, Reema Thareja, Oxford University press.
3. Introduction to Data Structure and its Applications Jean-Paul Tremblay, P. G. Sorenson.

Reference Book:

1. William Stallings: Computer Organization & Architecture, 9th Edition, Pearson, 2015.
2. Computer Organization / Hamacher, Vranesic, Zaky / T.M.H
3. Computer Organization and Organization / B Ram / Tata -McGraw-Hill.

Practical List :

1. Write a program to Implement Stack operations like push and pop using array and linked list
2. Write a program to implement infix to postfix transformation.

Diploma in Engineering
Subject Code: CO1203
Subject Name: Data Structure

3. Write a program to implement insertion and deletion of Queue operations using array and linked list.
4. Write a program to perform the following operations in singly linked list – Creation, Insertion, and Deletion.
5. Write a program to perform the following operations in doubly linked list – Creation, Insertion, and Deletion
6. Write a program to implement circular linked list
7. Write a program to implement Breadth First Search (BFS)
8. Write a program to implement Depth First Search (DFS)
9. Write a program to implement a binary search tree.
10. Write a program to find the minimum depth of a binary tree.

Course Outcomes:

Student will be able to:

Sr. No.	CO statement
CO-1	**Define** and classify various data structures, storage structures and common operations on them
CO-2	**Create** various linear data structures with their representation and perform different operations on them
CO-3	**Implement** different data structure
CO-4	**Create** various nonlinear data structures with their representation and perform different operations on them
CO-5	**Use** appropriate data structures for solving computing problem
CO-6	**Solve** the given a problem using an appropriate data structure to achieve optimal performance

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1204
Subject Name: Database Management System

Semester: - III

Type of course: Engineering Core.

Prerequisite: Knowledge of Computer.

Rationale: It covers the development of database-driven applications using the capabilities provided by modern database management system software. The concepts include conceptual modeling, relational database design and database query languages.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction of Database :** What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management,	4
2	**Data models:** The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction.	4
3	**Database design and ER Model :**Overview, ER-Model, Constraints, ER-Diagrams, ERD Issues, weak entity sets, Codd's rules, Relational Schemas, Introduction to UML Relational database model: Logical view of data, keys, integrity rules. Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF).	8

Diploma in Engineering
Subject Code: CO1204
Subject Name: Database Management System

	SECTION-B	
4	**Relational Algebra:** introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping and ungrouping, relational comparison. Calculus: Tuple relational calculus, Domain relational Calculus, calculus vs algebra, computational capabilities.	**7**
5	**Constraints:** What is constraints, types of constraints, Integrity constraints, Views: Introduction to views, data independence, security, updates on views, comparison between tables and views SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations. Triggers.	**6**
6	**Transaction Management:** ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks),Time stamping methods, optimistic methods, database recovery management.	**7**

Text Books:

1. G. K. Gupta :"Database Management Systems", McGraw – Hill.
2. Korth, Slberchatz,Sudarshan, :"Database System Concepts", 6th Edition, McGraw – Hill
3. Elmasri and Navathe, " Fundamentals of Database Systems", 5thEdition, PEARSON Education.
4. Peter Rob and Carlos Coronel, " Database Systems Design, Implementation and Management", Thomson Learning, 5th Edition.

Reference Books :

1. Dr. P.S. Deshpande, SQL and PL/SQL for Oracle 10g,Black Book, Dreamtech Press Mark L.
2. Gillenson, Paulraj Ponniah, " Introduction to Database Management",Wiley.
3. Sharaman Shah ,"Oracle for Professional", SPD.
4. Raghu Ramkrishnan and Johannes Gehrke, "Database Management Systems",TMH

Diploma in Engineering
Subject Code: CO1204
Subject Name: Database Management System

5. Debabrata Sahoo "Database Management Systems" Tata McGraw Hill, Schaum's Outline.

Practical List:

1. Design a Database and create required tables. For e.g. Bank, College.
2. Apply the constraints like Primary Key , Foreign key, NOT NULL to the tables.
3. Write a SQL statement for implementing ALTER,UPDATE and DELETE.
4. Write the queries to implement the joins .
5. Write the query for implementing the following functions: MAX(),MIN(),AVG(),COUNT() .
6. Write the query to implement the concept of Integrity constrains
7. Write the query to create the views.
8. Perform the queries for triggers.
9. Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints
10. Write the query for creating the users and their role.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Define** database ,database management system with its architecture
CO-2	**Learn** various data models and its types.
CO-3	**Design** various ER diagram and represent it using concept of UML.
CO-4	**Explain** relational algebra and types of tuples by designing diagrams on real time examples.
CO-5	**Compare** tables and views of SQL by applying different different constraints on given data.
CO-6	**Write** ACID properties and concept of deadlock.

Diploma in Engineering
Subject Code: IT1201
Subject Name: Digital Logic Design

Semester: - III

Type of course: Professional Core

Prerequisite: Knowledge of basic mathematics

Rationale: The course addresses the concepts, principles and techniques of designing digital systems. The course teaches the fundamentals of digital systems applying the logic design and development techniques. This course forms the basis for the study of advanced subjects like Computer Architecture and Organization, Microprocessor through Interfacing, VLSI Designing. Students will learn principles of digital systems logic design.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to digital electronics, Boolean algebra, Number system and codes**:-	**5**

Diploma in Engineering
Subject Code: IT1201
Subject Name: Digital Logic Design

	Concept of logic, Advantages and Disadvantages of Digital circuits. Introduction to digital ICs, Characteristics of digital ICs.Logic families comparison of TTL, CMOS and ECL logic Families (No circuits) Number System - Introduction to Binary, Octal, Decimal, Hexadecimal number system. Conversion between Number systems.1's complement and 2's complement and Binary arithmetic (addition, subtraction).BCD code, BCD arithmetic (addition, subtraction).	
2	**Logic Gates And Boolean Algebra:-** Logical symbol, logical expression and truth table of AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR gates. Universal gates – NAND and NOR gates. Logical circuits of basic gates using universal Gates. More than 2 input gates by using 2 input gates. Basic laws of Boolean algebra, Duality theorem, De Morgan's theorem.	**6**
3	**Combinational Logic Design / Circuits:-** Simplification of Boolean expression using Boolean algebra. Construction of logical circuits forms Boolean expressions. Boolean expressions using Sum of products and product of sums forms.K-map representation of logical functions and minimization (2,3,4 variable). Standardization of SOP & POS equations,Truth table, K-map, Simplified logical expression and logical circuit using basic gates and universal gates of: (a) Half adder and full adder. (b) Half subtractor and full subtractor. Binary parallel adder, adder-subtractor, BCD adder. Block diagram, Truth table, Logical expression and logic diagram of Multiplexers (4:1 and 8:1), Multiplexer Cascading and use of Multiplexer in implementation of Boolean function. Block diagram and Truth table of Demultiplexer (1:4; 1:8; 1:16).	**9**
	SECTION-B	
4	**Flip Flops And Sequential Logic Design:-** Symbol and Logic diagram using NAND gates, working and truth table of R S flip-flop. Symbol and Logic diagram using NAND gates, working, truth	**7**

Diploma in Engineering
Subject Code: IT1201
Subject Name: Digital Logic Design

	table and timing diagram of Clocked R S flip flop, Triggering: edge triggering and level triggering, Symbol and Logic diagram using NAND gates, working, truth table and timing diagram of J-K flip flop.	
5	**Memories:-** Classification of memories RAM, ROM, PROM, EPROM, EEPROM.Circuit diagram using CMOS transistors and working of Static and Dynamic RAM.	**4**
6	**A-D And D-A Converters:-** Circuit diagram and working of R-2R Ladder DAC and Weighted resistor DAC.DAC specifications. Block diagram and working of Ramp ADC, Dual slope ADC and Successive approximation ADC.ADC specification Advantages and Disadvantages of various methods.	**8**

Text Books:

1. Salivahanan & Arivazhaan Digital Circuit & Design Vikas Publication.
2. Soumitra Mandal Digital Electronics TMH publisher.

Reference Books:

1. P.Raja Digital Electronics Scitech Publisher.
2. Gupta, singhal Digital Electronics Katson Books publication.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Design** simple logic circuits.

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Subject Name: Digital Logic Design

CO-2	**Observe** outputs of logic circuits and understand the variety of different types of logic circuits.
CO-3	**Understand** how the logic works for electronics systems and their need in computational system.
CO-4	**Classify** different logic families, semiconductor memories and PLD devices.
CO-5	**Illustrate** reduction of logical expressions using Boolean algebra and k-map.
CO-6	**Implement** Digital Logic circuits using VHDL and functions using logic gates.

(Established under Gujarat Private Universities Act, 2009)

Diploma of Engineering
Subject Code: MH1201
Subject Name: Communication Skills in English

Shroff S.R. Rotary Institute of Chemical Technology

Semester: III

Type of course: Language and Communication

Prerequisite: Zeal to learn the Language

Rationale: The rationale of the curriculum is to help students to express their original ideas in English and also develop interest in language and literature with a focus on comprehension, and reading, speaking and writing skills.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No	Content	Total Hrs.
	SECTION-A	
1	**Prose:** 1) An Astrologer's Day by R. K. Narayan 2) The Portrait of a Lady by Khushwant Singh, 3) Sparrows by K.A. Abbas 4)The Night Train at Deoli by Ruskin Bond	**6**
2	**Poetry**:1) My Grandmother by Elizabeth Jennings, 2) My Papa's Waltz by Theodore Roethke, 3) The Road Not Taken by Robert Frost 4) The Tyger by William Blake.	**7**
3	**Fiction:** Robinson Crusoe by Daniel Defoe	**7**
	SECTION-B	
4	Listening Ability: Hearing & Listening, Types of Listening, Traits of an Effective Listener	**6**

Diploma of Engineering
Subject Code: MH1201
Subject Name: Communication Skills in English

5	Speaking Skills: Group Discussion, Interview, Presentation Strategies , Public Speaking	**6**
6	Writing :Mastering the final Skill: Paragraph Writing, Comprehension Passage Business Letters-Complaint, Enquiry, Sales, Order, Apology) Email Etiquettes	**7**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	15	15	15	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Reference Books:

1. Prism: Spoken and Written Communication, Prose & Poetry' published by Orient Longman
2. Robinson Crusoe, Daniel Defoe, Harper Collins, UK
3. Communication Skills by Sanjay Kumar& Pushp Lata, OUP.
4. The Most Anthologized Poems of the Last 25 Years - Literary ...

List of Practicals /Tutorials:

Language Laboratory Activities:

Sr. No.	Practical/ Exercise	Apprx. Hours required
1	Conversation at a Clinic	**2**
2	Seeking Information about various Engineering Programs at an Institute	**2**
3	At the cinema Hall	**2**

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Subject Code: MH1201
Subject Name: Communication Skills in English

4	Letter Writing	**2**
5	Conversing with your colleagues/Co-workers	**2**
6	Comprehension Passage	**2**
7	Picture Description & Completion of a Story	**2**
8	Presentation.	**2**
9	Group Discussion	**2**
10	Interview	**2**

Course Outcomes:

After Learning this course, students will be able to:

Sr. No.	**CO statement**
CO-1	Use English in day-to-day communication
CO-2	Use various forms of vocabulary in varied situations in oral and written communication.
CO-3	Comprehend the dynamics of various rules of grammar and check its validation while they speak and write language correctly
CO-4	Use grammar effectively to make themselves competent Listener, Speaker, Reader and Writer by exposing to various set of situations
CO-5	Write various formal and informal documents of day to day life
CO-6	Prepare for lifelong learning and enjoyment of English Language and literature.

List of Open Source Software/learning website:

- http://www.free-english-study.com/
- http://www.english-online.org.uk/course.htm

Prepared By: Ms.Vinitha Vakkayil

Moderated by: Dr.Purvi Naik (HOD, MSH Dept.)

(Established under Gujarat Private Universities Act, 2009)

Bachelor of Engineering
Subject Code: MH1202
Subject Name: Essence of Indian Traditional Knowledge

Shroff S.R. Rotary Institute of Chemical Technology

Semester: III

Type of course: Audit Course

Prerequisite: Zeal to learn the subject.

Rationale: At the end of the course, students will become aware of certain knowledge traditions and practices of India that are being followed in their families and society around them.

Teaching and Examination Scheme:

Teaching Scheme				Examination Marks				Total Marks
L	T	P	C	Theory Marks				
				ESE (E)	PA (M)	ESE (V)	PA (I)	
1	-	-	0	-	-	30	20	50

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Traditional Knowledge:** Definition of traditional knowledge, scope and importance, kinds of traditional knowledge, traditional knowledge Vs western knowledge.	**03**
2	**Protection of Traditional Knowledge:** Significance of protection of traditional knowledge,	**02**
3	**Role of Government:** Role of Government to harness traditional knowledge.	**02**
	SECTION-B	
4	**Education System in India**: Education in ancient, medieval and modern India, Aims of education, Different subjects of traditional education in India.	**03**
5	**Civilization and Culture:** Culture and Civilization, Cultural Heritage.	**02**

Bachelor of Engineering
Subject Code: MH1202
Subject Name: Essence of Indian Traditional Knowledge

6	**Essence of Indian Culture:** Essence of Indian Traditional Culture.	**01**

Suggested Specification table with Marks (Practical):

Distribution of Practical Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**10**	**5**	**5**	**10**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Reference Books:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.
2. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino.

Course Outcomes: After completing the course, students will be able to

Sr. No.	**CO statement**
CO-1	Understanding the concept of traditional knowledge and its importance
CO-2	Analyzing the need and importance of protecting traditional knowledge
CO-3	Understanding the traditional educational system in India
CO-4	Analyzing the Indian civilization and culture
CO-5	Understanding the basics and essence of traditional and western knowledge
CO-6	Analyzing the cultural heritage of traditional and modern India

List of Open Source Software/learning website:

- https://en.wikipedia.org/wiki/Traditional_knowledge
- https://oufastupdates.com/essence-of-indian-traditional-knowledgeeitk/

Prepared By: Mr. Arghya Chakraborty

Moderated By – Prof. Purvi Naik (HOD- MSH Dept)

Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: CO1206
Subject Name: Algorithm

Semester: - IV

Type of course: Engineering Science

Prerequisite: Knowledge of Computer

Rationale: The objective of this course is to prepare the student with the algorithmic foundations of computing. A sound grasp of algorithms is essential for any computer science engineer. Almost all programming involves algorithms at some level.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:`

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction:** Programming Models, Data Abstraction. Sets, Multisets, Stacks, Queues. Asymptotic and worst-case analysis of algorithms.	4
2	**Sorting:** The sorting problem, Bubble sort, Selection sort, Insertion sort, Merge sort, Quicksort.	5
3	**Strings:** String Sort, Tries. Substring Search. Regular Expressions, Elementary Data compression.	3
	SECTION-B	
4	**Searching**: Symbol Tables, Binary Search Trees, Balanced Search Trees. Hash Tables.	3

Diploma of Engineering
Subject Code: CO1206
Subject Name: Algorithm

5	**Graphs:** Definition of a directed and undirected graph. Paths, Cycles, spanning trees. Directed Acyclic Graphs. Topological Sorting. Minimum Spanning Tree algorithms. Shortest Path algorithms: Dijkstra's algorithm, Flow based algorithms.	**5**
6	**Backtracking and Branch and bound:** General Method, Backtracking: N-queen problem, Sum of subsets, Graph coloring, Branch and Bound: Travelling Salesperson Problem.	**4**

Text Book:

1. Ellis horowitz , sartaj Sahni , s. Rajsekaran. "Fundamentals of computer algorithms" University Press.
2. T.H.coreman , C.E. Leiserson,R.L. Rivest, and C. Stein, "Introduction to algorithms", 2nd edition , PHI publication 2005.
3. Alfred v. Aho , John E. Hopcroft , Jeffrey D. Ullman , "Data structures and Algorithm" .

Reference Books:

1. Algorithms, Sedgewick and Wayne, Pearson
2. Introduction to Algorithms, Cormen, Leiserson, Rivest and Stein. MIT Press
3. Introduction to Theory of Computation, Sipser Michael, Cengage Learning.
4. Design & Analysis of Algorithms, Gajendra Sharma, Khanna Publishing House.

Practical List :

1. Write a program to implement Merge Sort
2. Write a program to implement Insertion Sort.
3. Write a program to implement Bubble Sort
4. Write a program to implement Selection Sort.
5. Write a program to implement Quick Sort.
6. Write a program to implement Binary Search Trees
7. Write a program to implement Hash Tables.
8. Implementation of Graph and Searching (DFS and BFS).
9. Write a program to implement Dijkstra's algorithm.
10. Write a program to implement travelling salesman problem.

Diploma of Engineering
Subject Code: CO1206
Subject Name: Algorithm

Sr. No.	CO statement
CO-1	**Analyze** programming model also study worst case analysis.
CO-2	**Learn** various sorting strategies with number of examples
CO-3	**Prepare** string and generate sub string using regular expression from it.
CO-4	**Describe** searching trees and also study hash table .
CO-5	**Illustrate** directed and undirected graph through programming paradigm.
CO-6	**Understand** the concept backtracking and trace travelling salesman problem through it.

Diploma in Engineering
Subject Code: IT1202
Subject Name: Data Communication & Networks

Semester: - IV

Type of course: Program core course

Prerequisite: : Knowledge of Computer

Rationale: Understand types of network and popular networking protocols
Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction of Data Communications:** Data communications, Networks, Network types, Internet history. Network Models-Protocol layering, TCP/IP protocol suite, The OSI model, need for layered/modular architecture.	6
2	**Physical Layer:** Basis for Data Communication, Guided Transmission Media, Wired and Wireless Transmission Medium. **Data Link Layer:** Data Link Layer Design Issues, Error Detection and Correction, Data Link Control and Protocols, Local Area Network: Ethernet, Fast Ethernet, Gigabit Ethernet, Wireless LAN, Blue tooth, Connecting devices:-Repeaters, Hub, Bridges, Switch, Router, Gateways	7

Diploma in Engineering
Subject Code: IT1202
Subject Name: Data Communication & Networks

3	**Network Layer:** Network Layer Design Issues, Routing Algorithms (Optimality principle, Static Routing Algorithms, Shortest Path, Flooding, Dynamic routing Algorithms, Distance Vector, Link State routing.), Network Layer Protocols (IP Addressing , CIDR & NAT, IP layer protocols (ICMP, ARP, RARP, DHCP, BOOTP), IPv6).	**7**
SECTION-B		
4	**Transport layer:** Transport Layer Service, Elements of Transport protocols, Internet protocols (UDP and TCP) **Session Layer:-** Working and function of session layer, Protocols of session layers	**6**
5	**Presentation Layer:** Definition, Function and Protocols of presentation Layer. **Application Layer:** DNS- Definition, Function, Protocols of Application layer.	**5**
6	**Network Security:** Cryptography, Symmetric key Algorithms (DES, AES), Public key Algorithms-RSA, Digital Signatures, IPSec, Firewall.	**8**

Text Books:-

1. Andrew S Tanenbaum, David. J. Wetherall, “Computer Networks”, Pearson Education, 5th Edition

Reference Books:-

1. Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, Fourth Edition
2. Kurose and Ross, Computer Networking- A Top-Down approach, Pearson, 5th edition
3. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Morgan Kaufmann Publishers, Fifth Edition, 2011.
4. Fred Halsall, Computer Networking and the Internet, Addison Wesley, (5th edition)

Diploma in Engineering
Subject Code: IT1202
Subject Name: Data Communication & Networks

Practical List:

1. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
2 Study of Network Devices in Detail.
3 Study of network IP.
4 Connect the computers in Local Area Network.
5 Study of basic network command and Network configuration commands.
6 Performing an Initial Switch Configuration
7 Performing an Initial Router Configuration
8 Configuring and Troubleshooting a Switched Network
9 Implement RIP, OSPF and BGP.
10 Implement Static and Dynamic Routing

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Define** various network types.
CO-2	**Describe** the technical aspects of data communications on the Internet.
CO-3	**Understand** structure of routing by designing various protocols in details.
CO-4	**Analyze** layers of OSI models and observe how they interact and share data with each other.
CO-5	**Examine** various networking devices and networking monitoring system with the help of protocols.
CO-6	**Implement** various security algorithms.

Diploma in Engineering
Subject Code: IT1203
Subject Name: Web Designing and Development

Semester: - IV

Type of course: Program Core Course

Prerequisite: Basic knowledge of HTML and basic structure of web applications and services.

Rationale: This Subject is useful for Making own Web page and how to host own web site on internet. Along with that Students will also learn about the protocols involved in internet technology.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Web Design Principles** Basic principles involved in developing a web site, Planning process, Five Golden rules of web designing, Designing navigation bar, Page design, Home Page Layout, Design Concept, Internet, Web browser and Web servers.	4
2	**Basics in Web Design** Brief History of Internet, Concept of World Wide Web, Creation of a web site, Web Standards, Audience requirement, Concept of WWW, Internet and WWW, HTTP Protocol Request and Response, Concepts of effective web design, Web design issues including Browser, Bandwidth	5

Diploma in Engineering
Subject Code: IT1203
Subject Name: Web Designing and Development

	and Cache, Designing effective navigation.	
3	**Introduction to HTML** What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags, Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.	**4**
SECTION-B		
4	**Introduction to Cascading Style Sheets** Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model (Introduction, Border properties, Padding Properties, Margin properties), CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Color, Creating page Layout and Site Designs.	**5**
5	**DHTML :** Combining HTML, CSS and JavaScript, events and buttons, controlling your browser, **XML:** Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.	**4**
6	**Introduction to Figma** The Figma Design Tool, Color Styles, Creating Background, Shadow and blur effects, The Editor in Figma, Blending Modes, Using Images, Auto Layout in Figma, Alignment Distribution, Responsive Design, Vector Mode, 3D Mockups.	**4**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level

Diploma in Engineering
Subject Code: IT1203
Subject Name: Web Designing and Development

15	**30**	**25**	**30**	**0**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Text Book:

1. Steven Holzner,"HTML Black Book", Dremtech press.
2. Achyut Godbole,Atul Kahate"Web Technologies:TCP/IP,Web/Java Programming, and Cloud Computing",Third Edition,McGraw Hill Education
3. Web Technologies, Black Book, Dreamtech Press.
4. Jon Duckett "Beginning Web Programming" WROX.
5. Marty Hall and Larry Brown "Core Servlets and Java Server pages Vol. 1: Core Technologies", Pearson.

Reference Books:

1. Web Applications : Concepts and Real-World Design, Knuckles, Wiley-India
2. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson.
3. DanWoods and Gautam Guliani,"Open Source for the Enterprise: Managing Risks, Reaping Rewards", O'Reilly, Shroff Publishers and Distributors, 2005.
4. Wang,"An Introduction to web Design and Programming",Thomson

List of Practicals:

1. Write a HTML program to create a webpage to show various confectionary items using Ordered list, Unordered list, Definition list and Nested List.
2. Create a HTML document giving details of your [Name, Age], [Address, Phone] and [Register Number, Class] aligned in proper order using alignment attributes of Paragraph tag.
3. Write HTML for demonstration of cascading stylesheets.
   a. Embedded stylesheets.
   b. External stylesheets.
   c. Inline styles
4. Write a HTML program to create a webpage with four frames (Picture, table, list, and hyperlink).

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5. Write an HTML page that contains a selection box with a list of 5 countries, when the user selects a country, its capital should be printed next to the list; Add CSS to customize the properties of the font of the capital (color, bold and font size).
6. Design a webpage of your hometown with an attractive background color, text color, an image, font face by using inline CSS style.
7. Write a program to display contents of XML file in a table using Extensible Style Sheets.
8. Write a program for implementing XML document for CUSTOMER DETAILS.
9. Write an XML file which will display the book information which include the following:
   a) Title of the book
   b) Author name
   c) publisher name
   d) edition
   e) price
   Write a Document Type Definition (DTD) to validate the above XML file.
10. Design a website using Figma Tool.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Define** the principle of Web page design
CO-2	**Describe** the concepts of World Wide Web, and the requirements of effective web design.
CO-3	**Construct** basic websites using HTML and Cascading Style Sheets.
CO-4	**Develop** web pages using the CSS features with different layouts as per need of applications.
CO-5	**Design** simple web pages and represent the data in XML format
CO-6	**Illustrate** the concept of web publishing and hosting

Diploma in Engineering
Subject Code: CO1209
Subject Name: Java Programming

Semester: - IV

Type of course: Engineering Core

Prerequisite: Knowledge of Computer programming like C, C++.

Rationale: Java is a general-purpose computer programming language that is a class-based, object-oriented. It is intended to let application developers "write once, run anywhere" meaning that compiled Java code can run on all platforms that support Java without the need for recompilation.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Basics of Java:** Features of Java, Byte Code and Java Virtual Machine, JDK, Data types, Operator, Control Statements – If , else, nested if, if-else ladders, Switch, while, do-while, for, for-each, break, continue.	6
2	**Package:** Use of Package, CLASSPATH, Import statement, Static import, Access control.	5
3	**Exception Handling:** Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class.	6

Diploma in Engineering
Subject Code: CO1209
Subject Name: Java Programming

	SECTION-B	
4	**Inheritance and Interfaces:** Use of Inheritance, Inheriting Data members and Methods, constructor in inheritance, Multilevel Inheritance – method overriding Handle multilevel constructors – super keyword,Stop Inheritance - Final keywords, Creation and Implementation of an interface, Interface reference, instanceof operator, Interface inheritance, Dynamic method dispatch ,Understanding of Java Object Class,Comparison between Abstract Class and interface, Understanding of System.out.println – statement	**9**
5	**Collection Classes :** List, AbstractList, ArrayList, LinkedList, Enumeration, Vector, Properties, Introuduction to Java.util package	**4**
6	**Java Web Frameworks: Spring MVC** Overview of Spring, Spring Architecture, bean life cycle, XML Configuration on Spring, Aspect – oriented Spring, Managing Database, Managing Transaction	**6**

Text Books:

1. JAVA: The Complete Reference, Herbert Schildt, Ninth Edition, Oracle Press. 2 E. Balagurusamy, 'Programming with Java', McGraw Hill Education.

Reference Books:

1. Java Fundamentals A comprehensive introduction By Herbert Schildt, Dale Skrien, McGraw Hill Education.
2. Programming with Java A Primer – E.Balaguruswamy,Mc Grawhill
3. The Complete Reference, Java 2 (Fourth Edition),Herbert Schild, - TMH.
4. Core Java Volume-I Fundamentals Horstmann & Cornell, - Pearson Education. - Eight Edition

Practical List:

1. Install the JDK (Download the JDK and install it.)
   - Set path of the jdk/bin directory.
   - Create the java program Compile and run the java program

Diploma in Engineering
Subject Code: CO1209
Subject Name: Java Programming

Write a simple "Hello World" java program, compilation, debugging, executing using java compiler and interpreter.

2. Write a program to convert rupees to dollar. 60 rupees=1 dollar.
3. Write a program that calculate percentage marks of the student if marks of 6 subjects are given.
4. Write a program to find length of string and print second half of the string.
5. Write a java program which should display maximum number of given 4 numbers.
6. Write a program to accept a line and check how many consonants and vowels are there in line.
7. Write a program to count the number of words that start with capital letters.
8. Write a program to find that given number or string is palindrome or not.
9. Write a program in Java to demonstrate throw, throws, finally, multiple try block and multiple catch exception.
10. Write a program of XML using java framework.

Course Outcomes:

Student will be able to:

Sr. No.	CO statement
CO-1	**Use** various Java constructs, features and libraries for simple problems.
CO-2	**Demonstrate** how to define and use classes, interfaces, create objects and methods, how to override and overload methods, compile and execute programs
CO-3	**Write** a program using exception handling, multithreading with synchronization..
CO-4	**Design** inheritance an interface programs.
CO-5	**Create** your own packages.
CO-6	**Implement** bean life cycle

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: IT1204
Subject Name: Fundamentals of Software Development

Semester-IV

Type of course: Engineering Science

Prerequisite: Knowledge of Computer

Rationale: To study pioneer of Software Development Life Cycle, Development models and Agile Software development. Study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods. To learn the process of improve the quality of software work products.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	1	0	4	70	30	0	50	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Software and Software Engineering** The Evolving Role of Software, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models	**6**
2	**Requirement Analysis and Specification** Understanding the Requirement, Requirement Modelling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.	**6**

Diploma in Engineering
Subject Code: IT1204
Subject Name: Fundamentals of Software Development

3	**Managing Software Project** Software Metrics (Process, Product and Project Metrics), Software Project Estimations, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis &Management (Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation).	**7**
	SECTION-B	
4	**Software Design** Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design) (MS Visio Tool), User Interface Design, Web Application Design.	**6**
5	**Software Coding & Testing** Coding Standard and coding Guidelines, Code Review, Software Documentation, Testing Strategies, Testing Techniques and Test Case, Test Suites Design, Testing Conventional Applications.	**7**
6	**Quality Assurance and Management** Quality Concepts and Software Quality Assurance, Software Reviews (Formal Technical Reviews), Software Reliability, The Quality Standards: ISO 9000, CMM, Six Sigma for SE, SQA Plan.	**7**

Text Books:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

Reference Books:

1. Software Engineering – A Practitioner's Approach, 7th Edition, Roger Pressman.
2. Software engineering, Ian Sommerville, Pearson Education
3. An Integrated Approach to Software Engineering, Pankaj Jalote, Springer Verlag

Diploma in Engineering
Subject Code: IT1204
Subject Name: Fundamentals of Software Development

4. Software Engineering, Nasib Singh Gill, Khanna Book Publishing Co. India.
5. Software Engineering, K. K. Agarval, Yogesh Singh, New Age International Publishers

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** life cycle of software engineering.
CO-2	**Describe** the requirement specification and architecture of software.
CO-3	**Identify** the software risks.
CO-4	**Apply** various testing techniques and test plan.
CO-5	**Evaluate** the standards of quality assurance
CO-6	**Explain** various tools for project management.

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1211
Subject Name: Information Security

Semester: - IV

Type of course: Engineering Science

Prerequisite: Knowledge of Computer

Rationale:
To learn how to evaluate and enhance information security of IT infrastructure and organizations.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	1	0	4	70	30	0	50	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Information Security** Various aspects of information security (PAIN Points), Security Features of Operating Systems – Authentication, Logs, Audit Features, File System Protection, User Privileges, RAID options, Anti-virus software.	6
2	**Understanding security weaknesses in popular networking protocols** IP, TCP, UDP, RIP, OSPF, HTTP, SMTP, etc.; security weaknesses in common networking devices – Hub, switch, router, gateway.	7
3	**Security solutions** Wifi, Security solutions to mitigate security risk of networking protocols (IPSec, HTTPS, etc) and devices (VLAN, Ingress filtering etc.)	6
	SECTION-B	

Diploma in Engineering
Subject Code: CO1211
Subject Name: Information Security

4	**Basics of Cryptography** PKI, Security considerations while developing soft wares.	**5**
5	**Network Security Products** Firewall, IDS/IPS, VPN Concentrator, Content Screening Gateways, etc.	**6**
6	**Introduction to Security Standards** ISO 27001, Indian IT Act, IPR Laws; Security Audit procedures; Developing Security Policies; Disaster Recovery, Business Continuity Planning	**6**

Text Book:

1. Information Security Management: Concepts and Practicable G. Raggad,Pace university, Pleasantville, New York,USA

Reference Books:

1. Information Security and Cyber Laws, Sarika Gupta, Khanna Publishing House

Practical List

1. Write a Program to implement AES.
2. Write a program to perform Encryption / Decryption using Caesar cipher.
3. Write a program to perform Encryption/Decryption using Mono alphabetic techniques
4. Write a program to perform Encryption/Decryption using playfair system.
5. Write a program to perform Encryption/Decryption using Hill cipher Technique.
6. Write a program to perform Encryption/Decryption using transposition technique.
7. Write a program to perform Encryption/Decryption using Diffie-Helmen Key exchange.
8. Write a program for simple RSA algorithm to encrypt and decrypt the data.
9. Write a program for DES algorithm to encrypt and decrypt the data.
10. Write a program to study the steps of implementation of VPN using Packet

Diploma in Engineering
Subject Code: CO1211
Subject Name: Information Security

Course outcomes:

Students will be able to

Sr. No.	CO statement
CO-1	**Understand** the basics of Information security.
CO-2	**Identify** network devices**.**
CO-3	**Analyze** information security solutions.
CO-4	**Explain** the concept of cryptography.
CO-5	**Illustrate** the different network security products.
CO-6	**Describe** the standards of security.

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1212
Subject Name: Cyber Security

Semester: - IV

Type of course: Engineering Science

Prerequisite: Knowledge of Computer

Rationale: Basic fundamental knowledge of computers, Internet and network.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Systems Vulnerability Scanning:** Overview of vulnerability scanning, Open Port / Service Identification, Banner / Version Check, Traffic Probe, Vulnerability Probe, Vulnerability Examples, OpenVAS, Metasploit. Networks Vulnerability Scanning - Netcat, Socat, understanding Port and Services tools - Datapipe, Fpipe, WinRelay. Network Sniffers and Injection tools – Tcpdump and Windump, Wireshark, Ettercap, Hping Kismet.	**6**
2	**Network Defense tools :** Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall.	**7**

Diploma in Engineering
Subject Code: CO1212
Subject Name: Cyber Security

3	**Web Application Tools:** Scanning for web vulnerabilities tools: Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel, Application Inspection tools – Zed Attack Proxy, Sqlmap. DVWA, Webgoat, Password Cracking and Brute-Force Tools –John the Ripper, L0htcrack, Pwdump, HTC-Hydra.	**6**
	SECTION-B	
4	**Introduction to Cyber Crime and law :**Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics.	**6**
5	**Computer Crime :** Computer Language, Network Language, Realms of the Cyber world, A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000.	**5**
6	**Introduction to Cyber Crime Investigation :** Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks.	**6**

Text Books:

1. Introduction to Cyber Security Author Dr. Jeetendra Pande, Assistant Professor School of CS & IT, Uttarakhand Open University, Haldwani .

Reference Books:

1. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunit Belpure, Publication Wiley.

Diploma in Engineering
Subject Code: CO1212
Subject Name: Cyber Security

Course outcomes:
Student will be able

Sr. No.	CO statement
CO-1	**Understand** cyber-attack, types of cybercrimes, cyber laws and also how to protect them self and ultimately society from such attacks.
CO-2	**Learn** various network defense tools with number of examples.
CO-3	**Apply** various web application tools.
CO-4	**Explain** cyber-crime with real life examples.
CO-5	**Describe** computer crime with Indian IT ACT 2000.
CO-6	**Evaluate** attacks on wireless network.

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1213
Subject Name: Soft Computing

Semester: - IV

Type of course: Emerging areas.

Prerequisite: Nil

Rationale: The conventional methods of computing relying on analytical or empirical relations become time consuming and labor intensive to solve some complex problem. Soft computing techniques like Genetic Algorithms, Fuzzy logic and Artificial Neural Network can be applied effectively to solve complex problem. This subject gives understanding of various soft computing techniques.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction**: What is Soft computing? Necessity of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing	5
2	**Evolutionary Computing Basic Concepts of Genetic Algorithms** (GA): Working Principle, Encoding methods, Fitness function, GA Operators- Reproduction; Crossover; Mutation, Convergence of GA, Multi-level Optimization, Real Life Problems.	8
3	**Fuzzy Systems**: Fuzzy Set theory, Fuzzy Relation, Fuzzification, Minmax Composition, Defuzzification, Fuzzy Logic, Fuzzy Rule based	5

Diploma in Engineering
Subject Code: CO1213
Subject Name: Soft Computing

	systems, Fuzzy Decision Making, Fuzzy Control Systems, Fuzzy Classification.	
	SECTION-B	
4	**Neural Networks**: Basic Concept of Neural Network, Overview of Learning rules and activation functions, Single layer Perceptrons and Learning, Back Propagation networks- Architecture of Back propagation (BP) Networks; Backpropagation Learning; Variation of Standard Backpropagation Neural Network, Introduction to Associative Memory, Adaptive Resonance Theory and Self Organizing Map, Recent Applications.	**8**
5	**Hybrid Systems**: Sequential Hybrid Systems, Auxiliary Hybrid Systems, Embedded Hybrid Systems, Neuro-Fuzzy Hybrid Systems, Neuro-Genetic Hybrid Systems, Fuzzy-Genetic Hybrid Systems Network.	**4**
6	**Neural Network**: Based Fuzzy Systems Neural Realization of Basic Fuzzy Logic Operators, Neural Network Based Fuzzy Logic Inference, Neural Network Driven Fuzzy Reasoning, Rule based Neural Fuzzy Modeling, Neural Fuzzy Relational Systems, NeuroFuzzy Controllers, Recent Applications	**6**

Text Books:

1. S.N. Sivanandam & S.N. Deepa, Principles of Soft Computing, Wiley Publications, 2nd Edition, 2011.
2. S, Rajasekaran & G.A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic & Genetic Algorithms, Synthesis & applications, PHI Publication, 1st Edition, 2009.

Reference Books:

1. Principles of Soft Computing by S.N. Sivanandam, S.N. Deepa WILEY India Publication
2. Soft Computing with MATLAB Programming by N.P. Padhy & S. P. Simon by OXFORD
3. Neuro-Fuzzy and Soft Computing: A Computational Approach to Learning and Machine

Diploma in Engineering
Subject Code: CO1213
Subject Name: Soft Computing

Intelligence by Jyh-Shing Roger Jang Pearson
4. Genetic Algorithms: Search and Optimization, E. Goldberg. ADDISON-WESLEY PUBLISHING COMPANY, INC.
5. Fuzzy Logic and Engineering Application, Tomthy Ross, Wiley Publication

Course outcomes:
Student will be able

Sr. No.	CO statement
CO-1	**Identify** and describe soft computing techniques and their roles in building intelligent machines.
CO-2	**Evaluate** and compare solutions by various soft computing approaches for a given problem.
CO-3	**Understand** different soft computing techniques like Genetic Algorithms, Fuzzy Logic, Neural Networks and their combination.
CO-4	**Implement** algorithms based on soft computing.
CO-5	**Apply** soft computing techniques to solve engineering or real life problems.
CO-6	**Use** various tools to solve soft computing problems.