Ref: UPL University /SRICT/BOS/IT/2024-25/01
Date: 17.05.2025

Teaching Scheme for
Second Year Bachelor of Information Technology

Semester-III (Information Technology) Structure

Sr No	Category	Sub Code	Course Title	Hours Per Week			Total Hours	Credits	E	M	I	V	Total
				L	T	P							
1	Humanities & Social Science	MH2201	Communication Skills in English	2	0	2	4	3	70	30	20	30	150
2	Basic Science	MH2202	Mathematics-III	3	2	0	5	5	70	30	50	0	150
3	Engineering Science	CO2202	Digital Electronics	3	1	0	4	4	70	30	50	0	150
4	Professional Core Course	CO2203	Data Structure	3	0	2	5	4	70	30	20	30	150
5	Professional Core Course	CO2204	Database Management System	3	0	2	5	4	70	30	20	30	150
6	Professional Core Course	CO2205	Object Oriented Programming	3	0	4	7	5	70	30	20	30	150
7	Inplant Training	MH2205	In Plant Training	0	0	0	0	1	0	0	50	0	50
	Total			**17**	**3**	**10**	**30**	**26**	**420**	**180**	**230**	**120**	**950**

Semester-IV (Information Technology) Structure

Sr No	Category	Sub Code	Course Title	Hours Per Week			Total Hours	Credits	E	M	I	V	Total
				L	T	P							
1	Humanities & Social Science	MH2204	Universal Human Values	3	0	0	3	3	70	30	0	0	100
2	Basic Science	CO2206	Discrete Mathematics	3	1	0	4	4	70	30	50	0	150
3	Professional Core Course	CO2207	Operating System	3	0	2	5	4	70	30	20	30	150
4	Professional Core Course	IT2202	Data Communication & Networks	2	0	2	4	3	70	30	20	30	150
5	Professional Core Course	IT2203	Internet & Web Technologies	2	0	2	3	3	70	30	20	30	150
6	Professional Core Course	CO2210	Programming with Python	3	0	2	5	4	70	30	20	30	150
7	Professional Elective Course		Professional Elective 1	3	0	0	3	3	70	30	0	0	100
	Total			**20**	**1**	**6**	**27**	**24**	**490**	**210**	**130**	**120**	**950**

Sr No	Professional Elective	Sub Code
PE1	Object Oriented Technology	CO2211
PE1	Software Project Management	IT2204

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

Bachelor of Engineering
Subject Code: MH2201
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)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	Dynamics of Communication: Definition and process Kinesics Proxemics Paralinguistic features Importance of Interpersonal and Intercultural Communication in today's organizations	6
2	Technical Writing: Report writing Technical proposal Technical description Business letters(sales, order, complaint, adjustment, inquiry, recommendation, appreciation, apology, acknowledgement, cover letter) Agenda of meeting, Minutes of meeting Resume writing	7
3	Technical Communication: Public speaking, Group discussion, Presentation strategies, Interview skills, Negotiation skills ,Critical and Creative thinking in communication	7
	SECTION-B	
4	T Ethics in Engineering: Scope of engineering ethics, Accepting and sharing responsibility , Resolving ethical dilemmas, Making moral choices	**6**

Bachelor of Engineering
Subject Code: MH2201
Subject Name: Communication Skills in English

5	Etiquettes: Telephone etiquettes for foreign business trips, Etiquettes for small talks, Respecting privacy ,Learning to say NO, Time management, Scope of engineering ethics, Accepting and sharing responsibility ,Resolving ethical dilemmas ,Making moral choices	**7**
6	Self-development and Assessment: Change, Grow, Persist, Prioritize, Read, Learn, Listen, Record, Remember, Asses, Think, Communicate, Relate, Dream.	**6**

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)

Language Laboratory Activities:

Sr. no	**Practical/ Exercise**	**Apprx. Hours required**
1	Role Play	02
2	Letter writing: Formal	02
3	Group Discussion	02
4	Presentations	02
5	Book Review(Preferably related to self-development)	04
6	Mock Interview	02
7	Report writing	02
8	Case studies related to unit 4, 5 and 6	02
9	Conducting meeting with Agenda	02
10	Minutes of Meeting	02

Bachelor of Engineering
Subject Code: MH2201
Subject Name: Communication Skills in English

Reference Books:

1. Raman and Sharma, Technical Communications, OUP, New Delhi, 2017
2. Lata and Kumar, Communication Skills, OUP, New Delhi, 2018
3. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, New York, 2014
4. Mohapatra and Sreejesh S., Case Studies in Business Ethics and Corporate Governance, Pearson, UP, 2013
5. Ramesh and Ramesh, The Ace of Soft Skills, Pearson, UP, 2019
6. Sherfield, Montgomery and Moody, Cornerstone: Developing Soft Skills, UP, 2009
7. Open Sources: https://www.scu.edu/ethics/focus-areas/more/engineering-ethics/engineering-ethics-cases

Course Outcomes: After Learning this course, students will be able to:

Sr. No.	CO statement
CO-1	Define and describe dynamics of verbal and non-verbal aspects of communication.
CO-2	Associate with various formal documents of technical and professional communication
CO-3	Interpret communication of diverse formal situations taking place in organizations.
CO-4	Illustrate and examine the knowledge of ethical aspects of engineering
CO-5	Establish and explain social and professional etiquettes.
CO-6	Recommend self -development and self - assessment.

List of Open Source Software/learning website:

Open Sources: https://www.scu.edu/ethics/focus-areas/more/engineering-ethics/engineering-ethics-cases

(Established under Gujarat Private Universities Act, 2009)

Bachelor of Engineering
Subject Code: MH2202
Subject Name: Mathematics-III

Shroff S.R. Rotary Institute of Chemical Technology

Semester: - III

Type of course: Engineering Science

Prerequisite: Algebra, Trigonometry, Geometry, Differentiation, Integration

Rationale: The study to compute area, volume and Transformation of functions

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	2	0	5	70	30	0	50	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Fourier Series:** Periodic function, Trigonometric series, Fourier series, Functions of any period, Even and odd functions, Half-range Expansion.	5
2	**Laplace Transforms**: Definition of the Laplace transform, Linearity, Shifting theorems, Laplace transformation of elementary function, basic properties of Laplace transformation, Differentiation of Laplace transformation(multiplication by t), Integration of Laplace transformation(division by t), Laplace transformation of derivatives and integrals, unit step function. Evaluation of integrals using Laplace transformation.	10
3	**Curve Sketching**: Curve sketching in Cartesian Co-ordinates and Polar co-ordinates, Relation between Polar and Cartesian Co-ordinates.	5
	SECTION-B	
4	**Double integral and it's applications of:** over rectangular and general regions, properties of double integrals, Change of order, in polar coordinates, change of variables, Area by double Integrals	5

5	**Inverse Laplace transformation and its application:** Properties of inverse Laplace transformation, shifting theorem, multiplication and division by differentiation and integration of Laplace transformation. Convolution theorem, inverse Laplace transformation using partial fraction, solution of linear differential equation.	10
6	**Fourier integral:** Sine and cosine integral, even and odd functions	4

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**20**	**30**	**10**	**0**	**0**

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

Text Books:

1. Advanced Engineering Matheamtics by Ravish Singh and Mukul Bhatt.MC Graw Hill Education Pvt Ltd.

2. Engineering Mathematics Vol 2, by Baburam, Pearson

Reference Books:

1. Thomas' Calculus, Maurice D. Weir, Joel Hass, Frank R. Giordano, Pearson Education.
2. Advanced Engineering Mathematics (8th Edition), by E. Kreyszig, Wiley-India (2007).
3. R. V. Churchill and J. W. Brown, Fourier series and boundary value problems (7th Edition), McGraw-Hill (2006).

List of Tutorial:

1. Tutorial-1 (Fourier Series)

2. Tutorial-2 (Fourier Series)
3. Tutorial-3 (Laplace Transform)
4. Tutorial-4 (Laplace Transform)
5. Tutorial-5 (Curve sketching)
6. Tutorial-6 (Double Integral and its application)
7. Tutorial-7 (Double Integral and its application)
8. Tutorial-8 (Fourier Integral)
9. Tutorial-9 (Inverse Laplace Transformation)
10. Tutorial-10 (Inverse Laplace Transformation)

Course Outcomes: After learning this course students will be able to

Sr. No.	CO statement
CO-1	**Define** Laplace and Inverse Laplace transformation, Fourier Series and Integral.
CO-2	**Solve** differential equations Using Laplace transform and inverse Laplace Transformation.
CO-3	**Sketch** the Cartesian and Polar graphs.
CO-4	**Calculate** the area using Double integrals
CO-5	**Construct** a Fourier integral to evaluate the Integral.
CO-6	**Evaluate** the sum of series using Fourier series

List of Open Source Software/learning website:

- https://nptel.ac.in/
- http://www.sosmath.com/

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: CO2202
Subject Name: Digital Electronics

Semester: - III

Type of course: Engineering Core

Prerequisite: Basics of Computer

Rationale: Understanding of basic principles of Engineering is required in various field of engineering.

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	00	50	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Fundamentals of Digital Systems and logic** Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one‟s and two‟s complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.	7
2	**Combinational Digital Circuits Standard representation for logic Functions** K-map representation, and simplification of logic functions using K-map, minimization of logical functions. Don‟t care conditions,	8

Bachelor of Engineering
Subject Code: CO2202
Subject Name: Digital Electronics

	Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, QM method of function realization.	
3	**Sequential circuits and systems** A 1-bit memory, the circuit properties of Bistable latch, the clocked SR flip flop, J- K-T and D types flip flops, applications of flip flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple(Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC"s, asynchronous sequential counters, applications of counters	**7**
	SECTION-B	
4	**A/D and D/A Converters Digital to analog converters** Weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs	**8**
5	**Semiconductor memories** Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD	**3**
6	**Programmable logic devices** Programmable logic array Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).	**3**

Bachelor of Engineering
Subject Code: CO2202
Subject Name: Digital Electronics

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**	**10**	**10**	**05**

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

Text Book:

1. Digital logic and Computer design, M. M. Mano, Pearson Education India, 2016

Reference Books:

1. Fundamentals of Digital Circuits, A. Kumar, Prentice Hall India, 2016.
2. Digital Principles and Applications, Malvino & Leach, McGraw-Hill Education
3. Modern Digital Electronics, R. P. Jain, McGraw Hill Education, 2009.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Solve** the given problem using fundamentals of Number systems and Boolean algebra.
CO-2	**Analyze** working of logic families and logic gates and design the simple circuits using various gates for a given problem
CO-3	**Design** Combinational and Sequential logic circuits and verify its working
CO-4	**Implement** Combinational and Sequential logic circuits and verify its working
CO-5	**Examine** the process of Analog to Digital conversion and Digital to Analog conversion.
CO-6	**Use** PLDs for the given logical problem

Bachelor of Engineering
Subject Code: CO2202
Subject Name: Digital Electronics

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- www.coursera.org

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: CO2203
Subject Name: Data Structure

Semester: - III

Type of course: Engineering Core

Prerequisite: Programming for Problem Solving

Rationale: Understanding of basic principles of Engineering is required in various field of engineering.

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 Structure** Data types – primitive and non-primitive, Types of Data Structures- Linear & Non Linear Data Structures, Abstract Data types	3
2	**Linear Data Structure- Stack and Queue** **Array**: Representation of arrays, Applications of arrays, sparse matrix and its representation **Stack**: Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Prefix and Postfix Notations and their Compilation, Recursion, Tower of Hanoi **Queue**: Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Double Ended Queue, Array representation of Queue, Applications of Queue	9

Bachelor of Engineering
Subject Code: CO2203
Subject Name: Data Structure

3	**Linear Data Structure- Linked List** **Linked List**: Singly Linked List, Doubly Linked list, Circular linked list, Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.	**5**
	SECTION-B	
4	**Non Linear Data Structure – Tree & Graph** **Tree**-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees, Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance, **Graph**-Matrix Representation Of Graphs, Elementary Graph operations,(Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree)	**11**
5	**Hashing** Hashing: The symbol table, Hashing Functions, Collision Resolution Techniques	**3**
6	**File Structure** Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods.	**5**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**30**	**20**	**0**	**0**

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

Bachelor of Engineering
Subject Code: CO2203
Subject Name: Data Structure

Text Book:

1. Fundamentals of Data Structures, Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.

Reference Books:

1. Algorithms, Data Structures, and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. How to Solve it by Computer, 2nd Impression by R.G. Dromey, Pearson Education.
3. Programming with C, Second edition, by Gottfried, Tata McGraw-Hill Publishing Company Limited

List of Practicals:

1. Implementation of structure in c.
2. Write a program to implement a stack and perform push, pop operation.
3. Write a program to perform the following operations in a linear queue – Addition, Deletion, and Traversing.
4. Write a program to perform the following operations in the circular queue – Addition, Deletion, and Traversing
5. Write a program to perform the following operations in singly linked list – Creation, Insertion, and Deletion.
6. Write a program to perform the following operations in doubly linked list – Creation, Insertion, and Deletion
7. Write a program to create a binary tree and perform – Insertion, Deletion, and Traversal.
8. Write a program to create a binary search tree and perform – Insertion, Deletion, and Traversal.
9. Write a program for traversal of graph (B.F.S.)
10. Write a program for traversal of graph (D.F.S.)

Bachelor of Engineering
Subject Code: CO2203
Subject Name: Data Structure

Course Outcomes:

Students 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	**Apply** appropriate data structures for solving computing problem
CO-6	**Solve** the given a problem using an appropriate data structure to achieve optimal performance

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- https://nptel.ac.in/courses/106102064/
- www.coursera.org

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: CO2204
Subject Name: Database Management System

Semester: - III

Type of course: Engineering Core

Prerequisite: Basic knowledge of Computer Programming

Rationale: Understanding of basic principles of Engineering is required in various field of engineering.

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** File Organization, Comparison of File with DBMS, Application of DBMS, Purpose of DBMS, and Views of data - level of abstraction, data independence, database architecture, database users & administrators.	4
2	**Relational Model** Structure of relational databases, Domains, Relations, Relational algebra-operators and syntax, Relational algebra queries. **Entity Relational Model** Entity-Relationship model: Basic concepts, Design process Constraints, Keys, Design issues, E-R diagrams, Weak entity sets, extended E-R features- generalization, specialization, aggregation, reduction to E-R database schema.	7

Bachelor of Engineering
Subject Code: CO2204
Subject Name: Database Management System

3	**SQL Concepts** Basics of SQL, DDL, DML, DCL, Structure: creation, alteration, Defining constraints: Primary key, Foreign key, Unique key, Not null, check, IN operator, Aggregate functions, Built-in functions: numeric, date, string functions, set operations, Subqueries, correlated sub-queries: Join, Exist, Any, All, view and its types. Transaction control commands- Commit, Rollback, Savepoint. **Query Processing** Overview, Measures of query cost, Selection operation, Sorting, Join, Evaluation of expressions.	**10**
	SECTION-B	
4	**Database Design Concepts** Functional Dependency, definition, Trivial and non-trivial FD, Closure of FD set, closure of attributes, Irreducible set of FD, Normalization: 1NF, 2NF, 3NF, Decomposition using FD, Dependency preservation, BCNF, Multivalued dependency, 4NF Join dependency and 5NF, RAID Concepts.	**7**
5	**Transaction Management** Transaction concepts, Properties of Transactions, Serializability of transactions, Testing for serializability, system recovery, Two-Phase Commit protocol, Recovery and Atomicity, Log-based recovery, Concurrent executions of transactions and related problems, Locking mechanisms, Solution to Concurrency Related Problems, Deadlock, Two phase locking protocol	**5**
6	**PL/SQL Concepts** Cursors, Stored Procedures, Stored Function, Database Triggers, Indices.	**3**

Suggested Specification table with Marks (Theory):

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

Bachelor of Engineering
Subject Code: CO2204
Subject Name: Database Management System

20	**30**	**30**	**20**	**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. Database System Concept, 6th edition, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw Hill
2. SQL, PL/SQL-The Programming Language of Oracle, Ivan Bayross, BPB Publications

Reference Books:

1. An Introduction to Database system, C J Date, Addison-Wesley Publishing Company
2. Oracle: The Complete Reference, George Koch, Kevin Loney, TMH /Oracle Press

List of Practicals:

1. Create all the master tables using Data Definition Language Commands like Create and Describe.
2. Implement the use of alter table command.
3. Introduction to Transaction Control Commands like Commit, Rollback and Save point.
4. Implement SQL commands
    a. Use insert command to add data into created tables.
    b. Solve queries using update command.
    c. Implement SQL queries based on update and delete command.
5. Write SQL queries to solve problems with the use of the select command & generate different reports using select command.
6. Introduction to SQL functions.
7. Implement queries based on group by and having a clause.
8. Execution of queries based on natural, inner joins, outer join and self-join.
9. Introduction to sub-queries and demonstration of their usage.

Bachelor of Engineering
Subject Code: CO2204
Subject Name: Database Management System

10. Write the required SQL script to implement the given cursor & triggers.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Write** relational algebra expressions for that query and optimize the developed expressions
CO-2	**Design** the databases using E-R method and normalization.
CO-3	**Construct** the SQL queries for Open source and Commercial DBMS - MYSQL, ORACLE, and DB2
CO-4	**Execute** using Query optimization algorithms
CO-5	**Optimize** its execution using Query optimization algorithms
CO-6	**Apply** various database constraints on relational databases.

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- https://nptel.ac.in/courses/106105175/
- www.coursera.org

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: CO2205
Subject Name: Object Oriented Programming

Semester: - III

Type of course: Engineering Core

Prerequisite: Computer Programming

Rationale:

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	4	5	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Object Oriented Programming** OOP concepts: Objects, class, Encapsulation, Abstraction, Inheritance, Polymorphism, message passing, Java Virtual Machine, Basic programming constructs: variables, data types, operators, unsigned right shift operator, expressions, branching and looping.	4
2	**Class, Object, Packages and Input/output** Class, object, data members, member functions Constructors, types, static members and functions Method overloading Packages in java, types, user defined packages Input and output functions in Java, Buffered reader class, scanner class	6
3	**Array** Array, Strings, String Buffer, Vectors	7

Bachelor of Engineering
Subject Code: CO2205
Subject Name: Object Oriented Programming

	SECTION-B	
4	**Inheritance** Types of inheritance, Method overriding, super, abstract class and abstract method, final, Multiple inheritance using interface, extends keyword	**5**
5	**Exception handling and Multithreading** Exception handling using try, catch, finally, throw and throws, Multiple try and catch blocks, user defined exception Thread lifecycle, thread class methods, creating threads using extends and implements keyword.	**5**
6	**GUI programming in JAVA** Applet and applet life cycle, creating applets, graphics class functions, parameter passing to applet, Font and color class. Event handling using event class. Introduction to JDBC, JDBC-ODBC connectivity, JDBC architecture **Java Web Frameworks: Spring MVC** Overview of Spring, Spring Architecture, bean life cycle, XML configuration on Spring, Aspect – oriented Spring, Managing Database,	**9**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**30**	**20**	**0**	**0**

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

Bachelor of Engineering
Subject Code: CO2205
Subject Name: Object Oriented Programming

Practical List:

1. Programs on class and objects.
2. Program on method and constructor overloading.
3. Program on Packages
4. Program on 2D array, strings functions
5. Program on types of inheritance
6. Program on abstract class and abstract methods.
7. Program using super and final keyword
8. Program on Exception handling
9. Program on applet class
10. Program to create spring framework for XML.

Text Book:

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

Reference Books:

1. Beginning JAVA, Ivor Horton, Wiley India.
2. Dietal and Dietal, Java: How to Program, 8th Edition, PHI
3. JAVA Programming, Black Book, Dreamtech Press
4. Learn to Master Java programming, Staredu solutions

Bachelor of Engineering
Subject Code: CO2205
Subject Name: Object Oriented Programming

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the differences between Android and other mobile development environments.
CO-2	**Learn** how Android applications work
CO-3	**Use** life cycle, manifest, intents, and using external resources.
CO-4	**Design** and develop useful Android applications with compelling user interface.
CO-5	**Create** own layouts and views and using menus, data storage and other APIs.
CO-6	**Implement** java framework.

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- www.coursera.org

Bachelor of Engineering
Subject Code: MH2204
Subject Name: Universal Human Values

Shroff S.R. Rotary Institute of Chemical Technology

Semester: IV

Type of course: Humanities, Social Science including Management courses (HSMC)

Prerequisite: None. Basics of Universal Human Values (desirable)

Rationale: Course helps the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings

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	-	-	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Value Education :** Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity–the Basic Human Aspirations, Right Understanding, Relationship and Physical Facility, Happiness and Prosperity–Current Scenario, Method to Fulfill the Basic Human Aspirations.	8
2	**Harmony in the Family:** Harmony in the Family – the Basic Unit of Human Interaction, Values in Human-to-Human Relationship, Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation.	5
3	**Harmony in the Nature/ Existence:** Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at all levels, The Holistic perception of Harmony in Existence.	7
	SECTION-B	

4	**Harmony in the Human Being :**Understanding Human being as the Co-existence of the Self and the Body, Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health	8
5	**Harmony in the Society:** Understanding Harmony in the Society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive human goals, Visualizing a universal harmonious order in society.	4
6	**Implications of the Holistic Understanding – A Look at Professional Ethics :**Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Holistic Technologies, Production Systems and Management Models-Typical Case Studies, Strategies for Transition towards Value-based Life and Profession	7

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**20**	**20**	**10**	**10**	**0**

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

Text Books:

1. R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93- 87034-47-1.

2. R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2.

Bachelor of Engineering
Subject Code: MH2204
Subject Name: Universal Human Values

Reference Books:

1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N. Tripathi,, Human Values, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book)
4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"
5. E. F Schumacher, "Small is Beautiful".
6. Cecile Andrews, "Slow is Beautiful".
7. J C Kumarappa, "Economy of Permanence"
8. PanditSunderlal, "Bharat Mein Angreji Raj"
9. Dharampal , "Rediscovering India"
10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"
11. Maulana Abdul Kalam Azad , "India Wins Freedom"
12. Romain Rolland, "Vivekananda" (English)
13. Romain Rolland, "Gandhi" (English)

Course Outcomes:

After learning this course students will be able to:

Sr. No.	CO statement
CO-1	Relate themselves with the surroundings (family, society, nature)
CO-2	Explain sustainable solutions with respect to problems, keeping in mind the correlation between human relationships and human nature.
CO-3	Apply what they have learnt, into various day to day schedule.
CO-4	Distinguish between ethical and unethical practices and start working out the strategy in order to materialize a harmonious environment in the work place.
CO-5	Justify their commitment with respect to their understanding regarding human values, relationship and society.
CO-6	Develop the understanding of the intricacy of the problem and design appropriate solution.

Bachelor of Engineering
Subject Code: MH2204
Subject Name: Universal Human Values

List of Open Source Software/learning website:

- **https://www.uhv.org.in**
- **https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw**

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: CO2206
Subject Name: Discrete Mathematics

Semester: - IV

Type of course: Basic Science

Prerequisite: Basic concepts of Sets, Probabilities and Statistics.

Rationale: Understanding of basic principles of Engineering is required in various field of engineering.

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	00	50	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Set Theory:** Basic Concepts of Set Theory: Definitions, Inclusion, Equality of Sets, Cartesian product, The Power Set, Some operations on Sets, Venn Diagrams, Some Basic Set Identities **Functions:** Introduction & definition, Co-domain, range, image, value of a function; Examples, surjective, injective, bijective; examples; Composition of functions, examples; Inverse function, Identity map, condition of a function to be invertible, examples; Inverse of composite functions, Properties of Composition of functions	5
2	**Propositional Logic:** Definition, Statements & Notation, Truth Values, Connectives, Statement Formulas & Truth Tables, Well-formed Formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Examples	6

Bachelor of Engineering
Subject Code: CO2206
Subject Name: Discrete Mathematics

	Predicate Logic: Definition of Predicates; Statement functions, Variables, Quantifiers, Predicate Formulas, Free & Bound Variables; The Universe of Discourse, Examples, Valid Formulas & Equivalences, Examples	
3	**Relations:** Definition, Binary Relation, Representation, Domain, Range, Universal Relation, Void Relation, Union, Intersection, and Complement Operations on Relations, Properties of Binary Relations in a Set: Reflexive, Symmetric, Transitive, Anti-symmetric Relations, Relation Matrix and Graph of a Relation; Partition and Covering of a Set, Equivalence Relation, Equivalence Classes, Compatibility Relation, Maximum Compatibility Block, Composite Relation, Converse of a Relation, Transitive Closure of a Relation R in Set X	**8**
SECTION-B		
4	**Algebraic Structures:** Algebraic structures with one binary operation- Semigroup, Monoid, Group, Subgroup, normal subgroup, group Permutations, Coset, homomorphic subgroups, Lagrange's theorem, Congruence relation and quotient structures. Algebraic structures (Definitions and simple examples only) with two binary operation- Ring, Integral domain and field	**6**
5	**Basics of Statistics:** Elements, Variables, Observations, Quantitative and Qualitative data, Corss-sectional and Time series data, Frequency distribution, Dot plot, Histogram, Cumulative distribution, Measure of location, Mean, Median, Mode, Percentile, Quartile, Measure of variability, Range, Interquartile Range, Variance, Standard Deviation, Coefficient of Variation, Regression Analysis, Regression line and regression coefficient, Karl Pearson's method	**7**
6	**Probability Distribution:** Introduction, Conditional probability, Independent events, Independent experiments, Theorem of total probability and Bayes' theorem, Probability distribution, Binomial distribution, Poisson distribution, Uniform distribution, Normal distribution.	**7**

Bachelor of Engineering
Subject Code: CO2206
Subject Name: Discrete Mathematics

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**20**	**10**	**10**	**10**	**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. Discrete Mathematical Structures with Applications to Computer Science, J. P. Tremblay and R. Manohar, Tata McGraw-Hill,1997

Reference Books:

1. S. Lipschutz and M. L. Lipson, Schaum's Outline of Theory and Problems of Discrete Mathematics, 2nd Ed., Tata McGraw-Hill,1999.
2. K. H. Rosen, Discrete Mathematics and its applications, Tata McGraw-Hill, 6th Ed., 2007.
3. David Liben-Nowell, Discrete Mathematics for Computer Science, Wiley publication, July 2017.
4. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall, 2003.
5. T. Veerarajan, Probability, Statistics and Random Processes, Third edition, Tata McGraw- Hill, New Delhi, 2010.

Course Outcomes:

Students will be able to:

Sr. No.	**CO statement**
CO-1	**Understand** the basic principles of sets and operations in sets and apply counting principles to determine probabilities, domain and range of a function.
CO-2	**Apply** the properties of functions to application problems.
CO-3	**Write** an argument using logical notation.
CO-4	**Apply** relations and to determine their properties. Be familiar with recurrence relations.

Bachelor of Engineering
Subject Code: CO2206
Subject Name: Discrete Mathematics

CO-5	**Use** appropriate method to collect data and construct, compare, interpret and evaluate data by different statistical methods.
CO-6	**Interpret** and apply concept of probability in decision making, data distribution in probability.

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- www.coursera.org

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: CO2207
Subject Name: Operating System

Semester: - IV

Type of course: Engineering Core

Prerequisite: Linear and non-liner data structures, working experience of any one structured programming language

Rationale:

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	5	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction**: Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS-Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on UNIX and WINDOWS Operating System.	3
2	**Processes**: Definition, Process Relationship, Different states of a Process, Process State transitions, Process Control Block (PCB), Context switching **Thread**: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads **Process Scheduling**: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR;	7

Bachelor of Engineering
Subject Code: CO2207
Subject Name: Operating System

	Multiprocessor scheduling: Real Time scheduling: RM and EDF.	
3	**Inter-process Communication**: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc.	**7**
	SECTION-B	
4	**Deadlocks**: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.	**5**
5	**Memory Management:** Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging. **Virtual Memory**: Basics of Virtual Memory: Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).	**8**
6	**I/O Hardware**: I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms **File Management:** Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance. **Disk Management:** Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks	**6**

Bachelor of Engineering
Subject Code: CO2207
Subject Name: Operating System

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**15**	**5**	**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. Operating System Concepts Essentials, 9th Edition by AviSilberschatz, Peter Galvin, Greg Gagne, Wiley Asia Student Edition.

Reference Books:

1. Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
2. Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison Wesley

Practical List:

1. Study of basic commands of Linux.
2. Study of Advance commands and filters of Linux/UNIX.
3. Write a shell script to generate marksheet of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student.
4. Write shell scripts to find factorial of a given number.
5. Write shell scripts to Generate Fibonacci series etc.
6. Write a shell script which will accept a number b and display first n prime numbers as output
7. Write a shell script to read n numbers as command arguments and sort them in descending order.
8. Write a shell script to check entered string is palindrome or not.
9. Write an awk program using function, which convert each word in a given text into capital
10. Write a program for process creation using C. (Use of gcc compiler).

Bachelor of Engineering
Subject Code: CO2207
Subject Name: Operating System

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Create** processes and threads.
CO-2	**Develop** algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
CO-3	**Compare** and contrast various CPU scheduling algorithms.
CO-4	**Perform** inter-process communication.
CO-5	**Analyze** various algorithms for memory management, I/O management and Security aspects of operating system.
CO-6	**Design** and implement file management system.

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- www.coursera.org

Bachelor of Engineering
Subject Code: IT2202
Subject Name: Data Communication & Networks

Type of course: Engineering Core

Prerequisite: Basic knowledge of internet

Rationale:
To develop an understanding of modern network architectures from a design and performance perspective. To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs). To provide an opportunity to do network programming. To provide a WLAN measurement ideas.

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	**1. Introduction to Data Communication and Networks** Fundamentals of data communication, Data flow types (simplex, half-duplex, full-duplex), Network types (LAN, MAN, WAN, PAN), Network topologies and architectures, Client-server vs. peer-to-peer, Overview of OSI and TCP/IP models	**4**
2	**OSI Reference Model** Layer 1 – Physical Layer: Transmission media, encoding, multiplexing Layer 2 – Data Link Layer: Framing, error detection/correction, MAC protocols, Ethernet Layer 3 – Network Layer: IP addressing, subnetting, routing algorithms, ICMP	**6**

	Bache or of Engineering **Subject Code: IT2202** **Subject Name: Data Communication & Networks** Layer 4 – Transport Layer: TCP/UDP, segmentation, flow/congestion control Layer 5 – Session Layer: Session establishment and authentication Layer 6 – Presentation Layer: Encryption, compression, data translation Layer 7 – Application Layer: HTTP, FTP, DNS, SMTP	
3	**Transmission Media and Networking Devices** Guided media: twisted pair, coaxial, optical fiber Unguided media: radio, microwave, satellite Networking devices: NIC, switch, router, modem, hub, gateway	**3**
	SECTION-B	
4	**TCP/IP Protocol Suite and Addressing** TCP/IP model vs. OSI model, IP addressing (IPv4/IPv6), Subnetting, CIDR Protocols: IP, TCP, UDP, ICMP, ARP, DNS, HTTP, FTP, DHCP overview	**6**
5	**Switching and Routing Techniques** Switching: circuit, message, packet, Routing: static, dynamic, distance vector, link state, Interior and exterior routing protocols (RIP, OSPF, BGP), Routing tables and algorithms	**3**
6	**Network Security and Management** Network security goals and common threats, Cryptography: symmetric and asymmetric, Firewalls, VPNs, IDS/IPS, Basics of network management (SNMP)	**4**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**30**	**20**	**0**	**0**

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

Text Books:

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGrawHill.
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.

Bachelor of Engineering
Subject Code: IT2202
Subject Name: Data Communication & Networks

Reference Books:

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison-Wesley, United States of America.

Practical List:

1.Configure IP addresses on PCs and test connectivity using ping.
2.Create a LAN using a switch and multiple PCs.
3.Assign static IP addresses using subnetting and verify communication.
4.Connect different networks using routers and configure static routes.
5.Configure and test dynamic routing using the RIP protocol.
6.Set up VLANs on a switch and test inter-VLAN communication.
7.Configure a router to assign IP addresses dynamically using DHCP.
8.Use simulation mode to analyze packet flow through OSI layers.
9.Implementation of DNS and Web Server Simulation
10.Apply Access Control Lists (ACLs) to restrict access between networks

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: IT2202
Subject Name: Data Communication & Networks

Course Outcomes:
Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the fundamentals of data communication, network types, and architectures.
CO-2	**Analyze** the functions of each layer in the OSI model and associated protocols.
CO-3	**Understand** working of transmission media and networking devices.
CO-4	**Apply** IP addressing schemes, subnetting, and understand core TCP/IP protocols.
CO-5	**Analyze** switching techniques and routing algorithms for efficient data transmission.
CO-6	**Demonstrate** basic concepts of network security, cryptography, and network

List of Open Source Software/learning website:

Website: https://www.wireshark.org

Website: https://www.netacad.com (requires free registration)

https://www.netacad.com

Bachelor of Engineering
Subject Code: IT2203
Subject Name: Internet & Web Technologies

Semester: - IV

Type of course: Engineering Core

Prerequisite: Basic knowledge of Programming, Internet

Rationale: There is an ever-increasing demand for web developers: Businesses are always on a lookout for good web developers and designers and the demand is only going to grow in the future. This course will enable students to understand the basics of web development. It also covers latest Web development technologies like HTML5

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 to Web:** What is Web, Protocols and programs, Secure connections, application and development tools, the web browser, What is server, Types of Web Servers	04
2	**Web Design fundamentals:** Concepts of effective web design,Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User-centric design, Sitemap, Planning and publishing website, Designing effective navigation	05

Bachelor of Engineering
Subject Code: IT2203
Subject Name: Internet & Web Technologies

3	**Introduction to HTML:** HTML Basics, Elements, Attributes, Comments, Formatting, Links, Images, Tables, Lists, Block, Frames, HTML Meta Tags, HTML Forms, Form Elements, Various Input Elements.	**04**

SECTION-B		
4	**JavaScript:** Introduction to Client-Side Scripting, Purpose of JavaScript, Basic Syntax, Variables, Operators, Loops, Functions, Arrays, Array Methods, Strings, String Methods, Regular Expression, HTML Form Validation, Debugging.	**05**
5	**Cascading Style Sheets:**Introduction, Basic Syntax, Colors, backgrounds, Border, Margin, Padding, Height, Width, BOX Model, Other basic style elements. Layouts, Positions, Forms, Pseudo class, and elements, 2D and 3D transitions, Animations, CSS grids, Responsiveness.	**04**
6	**Server-Side Scripting with PHP:** Introduction to PHP, Basic Syntax, Variables, Operators, Loops, Functions, Strings, Constants, Arrays, Superglobals, PHP Form Handling, Validations, File Uploads, Cookies, Sessions, Error Handling.	**04**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**15**	**15**	**10**	**0**

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

Bachelor of Engineering
Subject Code: IT2203
Subject Name: Internet & Web Technologies

Text Books:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEY
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES
3. By Marty Hall and Larry Brown Pearson
4. An Introduction to WEB Design and Programming –Wang-Thomson
5. U. K. Roy, Web Technologies, First Edition, Oxford Higher Education

Reference Books:

1.Programming world wide web-Sebesta, Pearson Education,2007.
2.Internet and World Wide Web – How to program by Dietel and Nieto PHI/ PearsonEducationAsia.
3.Jakarta Struts Cookbook, Bill Siggelkow, S P D O' Reilly.
4.March's beginning JAVA JDK 5, Murach,SPD
5.PHP: The Complete Reference Steven Holzner TataMcGraw-Hill.Reference Books:
6.Kogent Learning Solutions Inc., Web Technologies Black Book, Dreamtech Press, 2009.
7.P.J.Deitel, H.M.Deitel, Internet & World Wide Web: How to program, Third Edition, Pearson Pub.

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: IT2203
Subject Name: Internet & Web Technologies

List of Practicals:

1. Design web pages for your college containing a description of the courses departments, faculties, library etc, use href, list tags.
2. Create your class timetable using table tag.
3. Create user Student feedback form (use textbox, text area, checkbox, radio button, select box etc.)
4. Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right-hand side.
5. Design a web page of your hometown with an attractive background color, text color, an Image, font etc. (use internal CSS).
6. Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript
7. Create HTML Page that contains form with fields Name, Email, Mobile No, Gender, Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked.
8. Write a php program to display today's date in dd-mm-yyyy format.
9. Write a php program to check if number is prime or not.
10. Create HTML page that contain textbox, submit / reset button.Write php program to display this information and also store into text file.

Course Outcomes:
Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the working of the web and its protocol.
CO-2	**Explore** the fundamentals of web design.
CO-3	**Design** a responsive web site using HTML5 and CSS3
CO-4	**Build** Dynamic website using JAVA script
CO-5	**Analyze** Dynamic website using CSS
CO-6	**Build** Dynamic website using server-side PHP Programming

Bachelor of Engineering
Subject Code: IT2203
Subject Name: Internet & Web Technologies

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- https://nptel.ac.in/courses/106106092/
- www.coursera.org

Bachelor of Engineering
Subject Code: CO2210
Subject Name: Programming with Python

Semester: - IV

Type of course: Engineering Core

Prerequisite: Programming for Problem Solving

Rationale: Understanding of basic principles of Engineering is required in various field of engineering.

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	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Python** History, Features of Python, Applications of Python, Working with Python, Input and Output Functions in Python, Variable Types, Basic Operators and Types of Data Int, Float, Complex, String, List, Tuple, Set, Dictionary and its Methods.	4
2	**Decision Structures in Python** Conditional Blocks Using if, Else and Else If, Simple for Loops in Python, For Loop Using Ranges, String, List and Dictionaries Use of While Loops in Python, Loop Manipulation Using Pass, Continue, Break and Else.	5
3	**Dictionary, List, Tuples and Sets**	7

Bachelor of Engineering
Subject Code: CO2210
Subject Name: Programming with Python

	Dictionaries, Accessing Values in Dictionaries, Working with Dictionaries, Properties, Functions and Methods. Sets, Accessing Values in Set, Working with Set, Properties, Functions and Methods, Tuple, Accessing Tuples, Operations, Working, Functions and Methods. List, Accessing List, Operations, Working With Lists, Function and methods, two-dimensional lists.	
	SECTION-B	
4	**Array and Strings in Python** Arrays, Basic Strings, Accessing Strings, Basic Operations, String Slicing, Testing, Searching and Manipulating Strings, Function and Methods. **Functions, Modules and Packages in Python** Introduction to Functions, Defining a Function, Calling a Function, Types of Functions, Function Arguments, Anonymous Functions, Global and Local Variables, Importing Module, Math Module, Random Module, Introduction to Packages: Numpy, Pandas, Matplotlib.	**4**
5	**Python Object Oriented Programming** OOP Concept of Class, Object and Instances, Constructor, Class, Attributes, Methods, Using Properties to Control Attribute Access, and Destructors, Inheritance, Overlapping and Overloading Operators. Objects in Python: Creating Python Classes, Modules and Packages, Inheritance in Python, Polymorphism in Python.	**8**
6	**Regular Expression in Python** RE Module, Basic Patterns, Regular Expression Syntax, Regular Expression Object, Match Object, Search Object, Findall method, Split method, Sub Method. **Creating the GUI Form and Adding Widgets:** **Widgets:** Button, Canvas, Checkbutton, Entry, Frame, Label, Listbox, Menubutton, Menu, Message, Radiobutton, Scale, Scrollbar, text, Toplevel, Spinbox, PanedWindow, LabelFrame, tkMessagebox. Handling Standard attributes and Properties of Widgets.	**8**

Bachelor of Engineering
Subject Code: CO2210
Subject Name: Programming with Python

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**30**	**30**	**20**	**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. Python Programming: A modular approach, Sheetal Taneja, Naveen Kumar, Pearson

Reference Books:

1. Python Cookbook, Python Cookbook and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. How to solve it by Computer, 2nd Impression by R.G. Dromey, Pearson Education.
3. Programming with C, Second edition, by Gottfried, Tata McGraw-Hill Publishing Company Limited

List of Practicals:

1. Implementation of different data types, Input Output in Python.
2. Implementation of Operators, Operator precedence.
3. Working with Arrays.
4. Working with Strings.
5. Implementation of Dictionaries, Sets and its various methods in Python.
6. Implementation of Tuples, Lists and its various methods in Python.
7. Working with functions and modules in Python.
8. Working with packages in Python.
9. Working with Object-oriented paradigms in Python.
10. Crate the GUI form.

Bachelor of Engineering
Subject Code: CO2210
Subject Name: Programming with Python

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the syntax and semantics of the 'Python' language.
CO-2	**Develop** proficiency in creating based applications using the Python Programming Language
CO-3	**Use** dictionaries of python.
CO-4	**Testing** and debugging of code written in Python**.**
CO-5	**Draw** various kinds of plots using PyLab**.**
CO-6	**Creating** the GUI Form.

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- www.coursera.org

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: CO2211
Subject Name: Object Oriented Technology

Semester: - IV

Type of course: Engineering Core

Prerequisite: Programming for Problem Solving

Rationale: Understanding of basic principles of Engineering is required in various field of engineering.

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:** About Object Orientated Technology, Development and OO Modeling History	2
2	**Modeling Concepts:** Modeling design Technique, Three models, Class Model, State model and Interaction model. **Class Modeling:** Object and class concepts, link and association, Generalization and Inheritance, Advanced class modeling- aggregation, Abstract class metadata, constraints.	9
3	**State Modeling:**	7

Bachelor of Engineering
Subject Code: CO2211
Subject Name: Object Oriented Technology

	Event, state, Transition and conditions, state diagram, state diagram behavior, concurrency, Relation of Class and State models. **Interaction Modeling:** Use case Models, sequence models, activity models	
	SECTION-B	
4	**Analysis and Design:** Development Life cycle, Development stages, Domain Analysis-Domain class model, domain state model, domain interaction model, Iterating and analysis. Application Interaction model, Application class model, Application state Model, Adding operation.	**6**
5	**System Design:** Estimating Performance, Making a reuse plan, breaking system into subsystems ,identifying concurrency, allocation of subsystems, management of data storage, Handling Global resources, choosing a software control strategy, Handling boundary condition, common Architectural style.	**6**
6	**Class Design:** Overview of class design ,designing algorithms recursing downward, refactoring, design optimization, Adjustment of Inheritance, Reification of Behavior.	**6**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**20**	**15**	**15**	**10**	**0**

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

Bachelor of Engineering
Subject Code: CO2211
Subject Name: Object Oriented Technology

Text Book:

1. Oriented Modeling and Design with UML second edition by Michael Blaha and James Rambaugh

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Understand** the concept of Object oriented Technology.
CO-2	**Describe** different modeling concepts.
CO-3	**Use** UML notation and symbols.
CO-4	**Implement t**he diagrams in Unified Modeling Language
CO-5	**Illustrate** about domain models and conceptual classes.
CO-6	**Construct** projects using UML diagrams.

List of Open Source Software

- www.coursera.org

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: IT2204
Subject Name: Software Project Management

Semester: - IV

Type of course: Engineering Core

Prerequisite: Basic understanding of software development processes and project management principles.

Rationale: Understanding of basic principles of software Engineering is required in various field of engineering.

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 Software Project Management- Project Definition, Project Attributes, Project Constraints, Project Management-Features of projects, Project Classification, Project Life Cycle, The Role Of Project Manager, Project Management Tools and techniques.	**05**
2	Software Life-Cycle Models- Waterfall, Rapid Prototyping, Incremental, Spiral, Agile, Software Development Process, The Context Of Information Technology Projects – (Software Projects, Software Development Process) Requirements Engineering - Processes, Requirements Specification, Use cases, and Functional specification, Requirements validation, Requirements Analysis.	**08**

Bachelor of Engineering
Subject Code: IT2204
Subject Name: Software Project Management

3	System Requirement Specifications - Role and Tasks of System Analyst, Data Dictionary, Feasibility Analysis, Overview of UML Diagrams, Data Flow Diagrams, Specification Document – Specification Qualities, Uses.	**06**
SECTION-B		
4	Software Project Measurement - Measures, Metrics and Indicators, Software Measurement, Size-Oriented Metrics, Function-Oriented Metrics, Software Quality Measures, Scheduling and Time line Chart. Software Project Planning - Software Scope, Resources, Estimation Techniques, Empirical Estimation Model, Outsourcing.	**07**
5	Risk Management - Risk Strategies, Software Risks, Risk Identification, Risk Projection, RMMM Plan, Software Quality Assurance- Quality Concepts, SQA	**06**
6	Software Testing Methods - Software Testing Fundamentals, Test CASE Design, White Box Testing, Basis Path Testing, Control Structure Testing, Black Box Testing, Unit Testing, Integration Testing, Validation Testing, System Testing	**07**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	**25**	**15**	**10**	**10**	**0**

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

Text Books:

1. Software engineering: A Practitioner's Approach, Roger Pressman, McGraw Hill Education
2. Software Project Management: Methods and Techniques by Barbara Ann Kitchenham
3. Agile Project Management: Creating Innovative Products by Jim Highsmith

Shroff S.R. Rotary Institute of Chemical Technology

Bachelor of Engineering
Subject Code: IT2204
Subject Name: Software Project Management

Reference Books:

1. Software Engineering Somerville – Pearson education PHI
2. Fundamentals of Software Engineering Rajib Mall, PHI
3. Software Engineering – A Precise Approach Wiley Pankaj Jalote

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Explain** the fundamental concepts of software project management, including project attributes, classifications, and life cycle models.
CO-2	**Apply** various software development life cycle models and requirements engineering processes to define and validate system requirements.
CO-3	**Analyze** system requirements using tools like Data Flow Diagrams (DFD) and UML, and prepare specification documents with appropriate qualities.
CO-4	**Evaluate** software metrics and estimation techniques to plan resources, scope, and time effectively for software projects.
CO-5	**Identify**, assess, and manage risks in software projects, and explain software quality assurance techniques and practices.
CO-6	**Design** and implement software testing strategies using white box and black box methods to ensure functional and system-level correctness.

Open Source Reference:

- https://archive.nptel.ac.in/courses/106/105/106105218/
- https://onlinecourses.nptel.ac.in/noc19_cs70/preview