

Deccan Education Society's
**Kirti M. Doongursee College of Arts,
Science and Commerce
(AUTONOMOUS)
Dadar (W), Mumbai -28**



Affiliated to
UNIVERSITY OF MUMBAI

Title of the program

- A-** U.G. Certificate in Information Technology
- B-** U.G. Diploma in Information Technology
- C-** B.Sc (Information Technology)

Syllabus for

Semester – Sem I & II

**Ref: GR dated 20th April, 2023 for Credit Structure of UG
(With effect from the academic year 2026-27
Progressively)**

PROGRAM OUTCOMES

PO	Description
A student completing Bachelor's Degree in Science Program will be able to	
PO1	Disciplinary Knowledge: Demonstrate comprehensive knowledge of the disciplines that form a part of a graduate Programme. Execute strong theoretical and practical understanding generated from the specific graduate Programme in the area of work.
PO2	Critical Thinking and Problem solving: Exhibit the skills of analysis, inference, interpretation and problem-solving by observing the situation closely and design the solutions
PO3	Social competence: Display the understanding, behavioral skills needed for successful social adaptation, work in groups, exhibit thoughts and ideas effectively in writing and orally.
PO4	Research-related skills and Scientific temper: Develop the working knowledge and applications of instrumentation and laboratory techniques. Able to apply skills to design and conduct independent experiments, interpret, establish hypothesis and inquisitiveness towards research
PO5	Trans-disciplinary knowledge: Integrate different disciplines to uplift the domains of cognitive abilities and transcend beyond discipline-specific approaches to address a common problem.
PO6	Personal and professional competence: Performing dependently and collaboratively as a part of a team to meet defined objectives and carry out work across interdisciplinary fields. Execute interpersonal relationships, self-motivation and adaptability skills and commit to professional ethics.
PO7	Effective Citizenship and Ethics: Demonstrate empathetic social concern and equity centered national development, and ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.
PO8	Environment and Sustainability: Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

PROGRAM SPECIFIC OUTCOMES

PSO	Description
	Upon completion of the program, graduates will possess highly specialized IT competencies, enabling them to:
PSO 1	Technical Proficiency: Demonstrate a comprehensive understanding of fundamental concepts, principles and technologies in information technology and apply programming and software development skills to design and implement IT solutions.
PSO 2	System Thinking and Analysis: Apply system analysis and design methodologies to analyze and address complex problems and design and develop IT systems that meet user requirements and organizational needs.
PSO 3	Database Management: Design, implement and manage relational databases to store and retrieve information effectively, while demonstrating proficiency in using database management systems and querying languages.
PSO 4	Networking and Security: Understand and implement computer networks, protocols and security measures as well as evaluate and implement security solutions to protect information systems.
PSO 5	Web and Emerging Technologies: Develop web applications using a variety of technologies and programming languages and seamlessly apply concepts of artificial intelligence, machine learning, cloud computing and IoT to solve real-world problems.
PSO 6	Project Management and Ethics: Apply project management principles to plan, execute and deliver IT projects, demonstrate the ability to work effectively within project teams, effectively communicate technical information and demonstrate ethical behavior and professionalism in all aspects of the IT profession.



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Sr. No.	Heading	Particulars	
1	Title of program O: _____ A	A	U.G. Certificate in Information Technology
	O: _____ B	B	U.G. Diploma in Information Technology
	O: _____ C	C	B.Sc. (Information Technology)
2	Eligibility	A	
	O: _____ A		10+2 (A learner must have completed HSC or equivalent with 45% of aggregate for open category and 40% of aggregate in case of reserved candidates in one attempt with Mathematics and/or Statistics as one of the subjects (OR) Passed Equivalent Academic Level 4.0 with CGPA equivalent to 45% for open category and 40% in case of reserved candidates with Mathematics and/or Statistics as one of the subjects
	O: _____ B	B	Under Graduate Certificate in Information Technology OR Passed Equivalent Academic Level 4.5
	O: _____ C	C	Under Graduate Diploma Information Technology OR Passed Equivalent Academic Level 5.0
	O. _____ D	D	Bachelors of Science in Information Technology with minimum CGPA of 7.5 OR Passed Equivalent Academic Level 5.5

3	Duration of program R: _____	A	One Year
		B	Two Years
		C	Three Years
4	Intake Capacity R: _____	120	



**Sign of the HOD &
Coordinator BOS in
Information
Technology**

**Sign of the NEP Coordinator,
DES's Kirti M. Doongursee
College**

**Sign of Principal
DES's Kirti M.
Doongursee College,
Mumbai 28.**

Preamble

1) Introduction

Information technology (IT) continues to be a dynamic and rapidly evolving field with high demand for skilled professionals. The demand for IT professionals is driven by various factors and the landscapes evolved over a period of time. The implementation of this curriculum under an autonomous framework aligned with the National Education Policy (NEP) 2020 enables a robust, multidisciplinary approach, making IT highly applicable across all facets of modern life. This flexible structure facilitates multi-institutional mobility for students both within India and abroad. This syllabus empowers and enables the students for higher education, research and specialized careers in the ever-expanding field of IT.

2) Aims and Objective

The primary aim of the B.Sc. program in Information Technology (IT) is providing students with a comprehensive understanding of the principles, technologies and applications within the field of information technology. By blending theoretical foundations with practical execution, the entire program collectively aims to produce graduates who are well-rounded IT professionals, capable of contributing to the design, development and management of information technology systems and services in various sectors.

3) Learning Outcomes

The B. Sc. (Information Technology) Programme shall prepare and enable the graduates to:

- ❖ Demonstrate proficiency in programming languages, Data structures, Design and implement software solutions with their technical competence
- ❖ Analyze user requirements and design effective IT systems or applications.
- ❖ Apply system analysis and design methodologies to address complex business challenges.
- ❖ Acquire the skills of Database Management, Networking and Security, Web Technologies
- ❖ Plan, execute, monitor, and control IT projects.
- ❖ Analyze and solve complex IT problems using critical thinking skills.
- ❖ Apply concepts of artificial intelligence, machine learning, cloud computing and IoT
- ❖ Effectively communicate technical information both orally and in writing.

4) Any other point (if any)

This curriculum fully leverages the flexibility of the autonomous framework to provide unique, career-accelerating advantages. It features industry-aligned Vocational Skill Courses (VSC) and Skill Enhancement Courses (SEC) designed to bridge the gap between academia and corporate requirements. Experiential learning is highly prioritized through mandatory On-the-Job Training (OJT) and Field Projects (FP). Furthermore, the program fosters the development of holistic professionals by integrating Value Education Courses (VEC) and incorporating elements of the Indian Knowledge System (IKS), ensuring graduates are not only technically proficient but also socially and culturally grounded.

Credit Structure of the Program

Semester	Course Code	Course Title	Vertical	Credit
I	26ITMJ111	Programming with C	Major 1	2
	26ITMJ112	Database Management Systems	Major 2	2
	26ITMJP11	Practical A (Major-1) + B (Major-2)	Practical	2
	26ITOE131	Introduction to Information Technology	OE	2
	26ITVC141	Combinational and Sequential Design	VSC	2
	26ITSE151	Office Tools for Data Management	SEC	2
	26ITSE152	OR Fundamentals of Telecommunication Systems		
II	26ITMJ211	Object Oriented Programming using C++	Major	2
	26ITMJ212	Web Designing	Major	2
	26ITMJP21	Practical A (Major-1) + B (Major-2)	Practical	2
	26ITMR221	Fundamentals of Mathematics	Minor	2
	26ITOE231	Research Foundation & Statistics	OE	2
	26ITVC241	Assembly Language Programming	VSC	2
	26ITSE251	PL/SQL	SEC	2
	26ITSE252	OR Web Programming		

SEMESTER-I

Syllabus B.Sc.
(Information Technology)
(Semester- I)

Course Code	MAJOR SEM – I	Credits	Lectures /Week
26ITMJ111	Paper I-Programming with C	2	2
Course Objectives(CO): Student will be able to CO1: Understand core concepts of C programming including program structure, data types, variables, operators, and the compilation process. CO2: Develop problem-solving skills using algorithms, pseudocode, flowcharts, and control flow constructs such as decision-making and loops. CO3: Implement modular and efficient programs using functions, pointers, arrays, and strings. CO4: Apply user-defined data types such as structures and unions to handle complex data effectively.			
Course Outcomes (OC): Student can OC1: Recall basic concepts of C programming such as data types, variables, operators, program structure, and syntax. OC2: Explain the working of control structures, functions, pointers, and the compilation process in C programs. OC3: Develop C programs using decision-making, loops, arrays, functions, strings, and pointers to solve computational problems. OC4: Analyze and debug C programs, and differentiate between various data handling techniques including structures, unions, and pointers for efficient problem-solving.			
Unit	Topics	No of Lectures	
I	Introduction: Algorithms, History of C, Structure of C Program. Program Characteristics, Compiler, Linker and preprocessor, pseudo code statements and flowchart symbols, Desirable program characteristics. Program structure. Compilation and Execution of a Program, C Character Set, identifiers and keywords, data types and sizes, constants and its types, variables, Character and character strings, typedef, typecasting Type of operators: Arithmetic operators, relational and logical operators, Increment and Decrement operators, assignment operators, the conditional operator, Assignment operators and expression, Precedence and order of Evaluation Block Structure, Initialization, C Preprocessor	15	
II	Control Flow: Statements and Blocks, If-Else, Else-If, Switch, Loops- While and For Loops Do-while, Break and Continue, Goto and Labels Basics of functions: User defined and Library functions Pointer and Addresses: Pointer and Function Arguments, Pointer and Arrays. Strings: Character array, string functions. User-defined data types- structure and union	15	

Textbooks:

1. C Programming Language, Brian W. Kernighan, Dennis M. Ritchie, 2017
2. Let Us C, Yashvant Kanetkar, BPB Publications, 2008.

Additional References:

1. Mastering in C, K. R. Venugopal and Sudeep R. Prasad, Tata McGraw-Hill Publications.
2. A Computer Science –Structure Programming Approaches using C, Behrouz Forouzan, Cengage Learning.
3. Schaum outlines Programming with C, Byron S. Gottfried, Tata McGraw- Hill Publications.
4. Basics of Computer Science, by Behrouz Forouzan, Cengage Learning.
5. Programming Techniques through C, by M. G. Venkateshmurthy, Pearson Publication.

Course Code	MAJOR SEM – I	Credits	Lectures /Week
26ITMJ111	Paper II - Database Management Systems	2	2
Course Objectives (CO): Student will be able to: CO1: Gain knowledge of database concepts, data models, system architecture, and the role of transactions in managing data efficiently. CO2: Understand real-world requirements and convert them into structured ER models, including entities, relationships, constraints, and relational mappings. CO3: Design well-structured relational schemas using normalization principles and dependency analysis to ensure consistency and minimize redundancy. CO4: Apply SQL for data manipulation and definition, and understand query processing, indexing, transaction control, concurrency, and recovery mechanisms.			
Course Outcomes (OC): Student can: OC1: Recall and describe key concepts of DBMS including data models, database architecture, ER modeling, relational model, and transaction fundamentals. OC2: Explain database design principles, normalization concepts, SQL operations, indexing techniques, and transaction management including concurrency control and recovery mechanisms. OC3: Apply ER modeling, relational schema design, normalization rules, and SQL queries to develop and manage database solutions. OC4: Analyze database systems by evaluating design choices, query optimization, indexing strategies, and transaction processing techniques for consistency, efficiency, and reliability			
Unit	Topics	No of Lectures	
I	Introduction to Databases and transactions What is database system, purpose of database system, view of data, relational databases, database architecture, transaction management. Data Models The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction. Database Design, ER-Diagram Database design and ER Model: overview, ER-Model, Constraints, ER-Diagrams, ERD Issues, Codd's rules, Relational Schemas. Relational database model Logical view of data, keys, integrity rules.	15	
II	Database Design theory and normalization: Basics of functional dependencies and normalization for relational databases. Relational database design and further dependencies. SQL, Indexing: Introduction to SQL, Complex queries, triggers, views, joining database tables and schema modification. Query Processing and optimization. File structure, hashing and indexing.	15	

	Transaction management and concurrency control and recovery: Introduction to transaction processing concepts and theory. Concurrency control technique. Database recovery technique.	
Textbooks: 1. “Fundamentals of Database System”, Elmasri Ramez, Navathe Shamkant, Pearson Education, Seventh edition, 2017 2. Database Management Systems”, Raghu Ramakrishnan and Johannes Gehrke, 3rd Edition, 2014 Additional References: 1. “MySQL: The Complete Reference”, Vikram Vaswani , McGraw Hill, 2017 2. “Learn SQL with MySQL: Retrieve and Manipulate Data Using SQL Commands with Ease”, Ashwin Pajankar, BPB Publications, 2020		

Course Code	MAJOR SEM – I	Credits	Lectures/ Week
26ITMJP11	Practical A+B - A. Programming with C B. Database Management Systems	2	2
Practical A- Programming with C			
Course Objectives (CO): Student will be able to: CO1: Develop problem-solving skills using C programming by designing algorithms and flowcharts for basic computational problems. CO2: Implement control structures and mathematical logic to solve problems such as conditional operations, loops, recursion, and numerical computations. CO3: Apply programming concepts to handle data structures including arrays, strings, functions, pointers, and matrices. CO4: Design and develop structured programs and mini-projects (e.g., bank management system) using modular programming and user-defined data types.			
Course Outcomes (OC): Student can: CO1: Recall fundamental C programming concepts such as syntax, data types, operators, control structures, and basic functions. CO2: Explain problem-solving approaches using algorithms, flowcharts, and demonstrate understanding of program logic including conditions, loops, and functions. CO3: Develop C programs to solve problems involving arithmetic operations, decision-making, loops, arrays, strings, recursion, and matrix operations. CO4: Analyze, debug, and optimize programs, and design structured solutions including the use of pointers, user-defined data types, and mini-project development.			
Practical A- Programming with C			
1	a. To calculate simple interest taking principal, rate of interest and number of years as input from the user. Write algorithm & draw flowchart for the same. b. Write a program to find greatest of three numbers using conditional operator. Write algorithm & draw flowchart for the same. c. Write a program to check if the year entered is leap year or not. Write algorithm & draw flowchart for the same.		
2	a. Write a program to calculate roots of a quadratic equation. b. Write a menu driven program using switch case to perform add / subtract / multiply / divide based on the user's choice. c. Write a program to print the pattern of asterisks.		
3	a. Write a program using a while loop to reverse the digits of a number. b. Write a program to calculate the factorial of a given number. c. Write a program to print the Fibonacci series.		
4	a. Write a program to print the area of a square using a function. b. Write a program using a recursive function. c. Write a program to square root, abs() value using function. d. Write a program using a goto statement .		
5	a. Write a program to print rollno and names of 10 students using an array. b. Write a program to sort the elements of array in ascending or		

	descending order
6	a. Write a program to extract the portion of a character string and print the extracted part. b. Write a program to find if the given string is palindrome or not. c. Write a program using strlen(), strcmp() function .
7	Write a program to swap two numbers using a function. Pass the values to be swapped to this function using call-by-value method and call-by-reference method.
8	a. Write a program to read a matrix of size m*n. b. Write a program to multiply two matrices using a function.
9	Write a program to print the structure using Title Author Subject Book ID Print the details of two Books.
10	Create a mini project on “Bank management system”. The program should be menu driven.

Textbooks:

1. “Programming in ANSI C”, E. Balaguruswamy, Tata McGraw-Hill Education.

Reference Books:

1. MASTERING C, K. R. Venugopal and Sudeep R. Prasad, Tata McGraw-Hill Publications.
2. “A Computer Science –Structure Programming Approaches using C”, Behrouz Forouzan, Cengage Learning.
3. Schaum’s outlines “Programming with C”, Byron S. Gottfried, Tata McGraw-Hill Publications.

Practical B- Database Management Systems

Course Objectives (CO): Student will be able to:

CO1: Design and develop conceptual database models using ER diagrams by identifying entities, attributes, keys, and relationships with appropriate cardinalities.

CO2: Create, modify, and manage databases and tables using SQL commands, including applying constraints such as NOT NULL, UNIQUE, PRIMARY KEY, and FOREIGN KEY.

CO3: Manipulate and retrieve data using SQL queries involving insert, update, delete operations, aggregate functions, mathematical functions, sorting, filtering, grouping, joins, and subqueries.

CO4: Manage database security and optimization features using views, Data Control Language (DCL) commands, and transaction control mechanisms like COMMIT and ROLLBACK.

Course Outcomes (OC): Student can:

OC1: Define and recall fundamental database concepts such as ER diagrams, entities, attributes, keys, relationships, and basic SQL commands.

OC2: Explain and interpret database operations including creation of databases and tables, constraints, and data manipulation using SQL statements.

OC3: Apply SQL queries for performing CRUD operations, joins, subqueries, aggregate functions, and data filtering and sorting in practical scenarios.

OC4: Analyze and design database solutions using ER modeling, views, transaction control, and user permission management.

Practical B- Database Management Systems	
1	Conceptual Designing using ER Diagrams (Identifying entities, attributes, keys and relationships between entities, cardinalities, etc.)
2	Perform the following: • Viewing all databases • Creating a Database • Viewing all Tables in a Database • Creating Tables (With and Without Constraints) • Inserting/Updating/Deleting Records in a Table
3	Perform the following: • Altering a Table • Dropping/Truncating/Renaming Tables
4	Creating and managing the tables: • Creating table with constraints: NOTNULL, UNIQUE, PRIMARY KEY, FOREIGN KEY
5	Perform the Aggregate and Mathematical functions: • AVG, MIN, MAX, SUM, COUNT • ABS, SQRT, ROUND, TRUNCATE, SIGN, POWER, MOD, FLOOR, CEIL
6	Restricting and sorting data: • Using DISTINCT, IN, AS, SORT, LIKE, ISNULL, OR • Using Group By, Having clause, Order By clause
7	Join Queries: • Inner Join • Outer Join
8	Subqueries: • With IN clause • With EXISTS clause
9	Views: • Creating Views • Dropping views • Selecting from a view
10	DCL statements • Granting and revoking permissions • Saving (Commit) and Undoing (Rollback)
Textbooks: 1. “Fundamentals of Database System”, Elmasri Ramez, Navathe Shamkant, Pearson Education, Seventh edition, 2017. 2. Database Management Systems”, Raghu Ramakrishnan and Johannes Gehrke, 3rd Edition, 2014 Additional References: 1. “MySQL: The Complete Reference”, Vikram Vaswani , McGraw Hill, 2017. 2. “Learn SQL with MySQL: Retrieve and Manipulate Data Using SQL Commands with Ease”, Ashwin Pajankar, BPB Publications, 2020.	

Course Code	OPEN ELECTIVE SEM – I	Credits	Lectures/ Week
26ITOE131	Paper I- Introduction to Information Technology	2	2
Course Objectives(CO): : Student will be able to: CO1 : Understand the fundamentals of computer networks, Internet concepts, and web technologies used in business environments. CO2: Develop awareness of cybersecurity issues, hacking techniques, and IT risks in organizations. CO3: Introduce enterprise software systems (CRM, SCM, ERP) and their role in managing business operations. CO4: Provide knowledge of DBMS, Data Warehousing, and Data Mining for effective data management and decision-making			
Course Outcomes (OC): Students can OC1:Recall basic concepts of computer networks, Internet, and web technologies. OC2:Identify cybersecurity threats, types of hacking, and analyze IT risks in business contexts. OC3: Apply DBMS concepts and analyze the role of Data Warehousing and Data Mining in business decision-making. OC4:Analyze enterprise systems like CRM, SCM, and ERP by comparing their features, functions, and applications in organizational contexts.			
Unit	Topics	No of Lectures	
I	Internet and IT in Risk Management 1.1 Basics of computer networks- LAN, MAN, WAN, CAN. Concept of the Internet, Types of the Internet, Application of Internet, Connecting to the Internet, Knowing the Internet, basic of Internet connectivity of troubleshooting 1.2 World wide web- Web Browsing software, search engines, understanding URL, Domain name, IP Address, using E governance website. 1.3 Hacking issues, Types of hacking, types of hackers and case studies related to hacking. 1.4 IT risks – Information security environment in India with respect to real-time applications in business. 1.5 Types of Software -CRM, SCM, ERP	15	
II	Introduction of Database and Datawarehouse 2.1 Introduction to DBMS. Meaning of DBMS, Need for using DBMS. Concepts of tables records, attributes, keys, integrity constraints, schema architecture, and data independence.	15	

	2.2 Data Warehousing and Data Mining Concepts of Data Warehousing, Importance of Data Warehouse for an organization, Characteristics of Data Warehouse, Functions of Data Warehouse, Architecture, Business use of Data Warehouse, Standard Reports and queries. 2.3 Data Mining The scope and the techniques used Business Applications of Data warehousing and Data mining.	
References: 1. Information Technology Management: A Business Plan Enabler, by Dennis McBreen, 2019, Braughler Books, LLC. 2. Information technology for management, 6th ED by Beth Melton, Mark Dodge, Echo, Tata McGraw Hill.		

Course Code	VOCATIONAL SKILL COURSE SEM – I	Credits	Lectures/ Week
26ITVSC141	Paper I -Combinational and Sequential Design	2	2
Course Objectives(CO): Student will be able to: CO1:Verify the functionality of basic and universal logic gates and validate De Morgan's Theorems. CO2: Construct combinational circuits including code converters (Binary/Gray/BCD), adders, subtractors, and multipliers. CO3:Implement data routing circuits using Encoders, Decoders, Multiplexers, and Demultiplexers CO4:Design and Analyze sequential circuits, including flip-flop conversions, Mod-N counters, and various Shift Register configurations (SISO, SIPO, PISO, PIPO).			
Course Outcomes (OC): Student can: OC1:Define and label the pin configurations and functions of standard logic gate ICs such as 7400, 7404, and 7486. OC2:Explain the working principles of combinational and sequential circuits, including the functional verification of De Morgan's laws OC3:Construct and build functional digital circuits such as adders, subtractors, and code converters using logic gates and universal gates. OC4:Examine and distinguish between different types of counters, shift registers, and multiplexers to solve specific digital logic requirements.			
1	Study of Logic gates and their ICs: a. Study of AND, OR, NOT, XOR, XNOR, NAND and NOR gates b. Study of IC 7400, 7402, 7404, 7408, 7432, 7486, 74266		
2	a. Implement AND, OR, NOT, XOR, XNOR using NAND gates. b. Implement AND, OR, NOT, XOR, XNOR using NOR gates.		
3	Verifying De Morgan's laws. a. $(A + B)' = A' \cdot B'$ b. $(A \cdot B)' = A' + B'$		
4	Implement code converters. a. Design and implement Binary – to – Gray code converter. b. Design and implement Gray – to – Binary code converter. c. Design and implement Binary – to – BCD code converter.		
5	Implement Adder and Subtractor Arithmetic circuits. a. Design and implement Half adder and Full adder. b. Design and implement binary subtractor.		
6	Implement Arithmetic circuits. Design and implement a 2-bit by 2-bit multiplier.		
7	Implement Encode and Decoder and Multiplexer and Demultiplexers. a. Design and implement 8:3 encoder. b. Design and implement a 4:1 multiplexer. Study of IC 74153, 74157		
8	Study of flip-flops and counters. a. Study of flip-flops and counters.		

	b. Conversion of Flip-flops.
9	Study of counter ICs and designing Mod-N counters. Study of IC 7490, 7492, 7493 and designing mod-n counters using these.
10	Design of shift registers and shift register counters. Design serial – in serial – out, serial – in parallel – out, parallel – in serial – out, parallel – in parallel – out and bidirectional shift registers using IC 7474.
Textbooks: 1. Digital Electronics and Logic Design, N. G. Palan, Technova Additional References: 1. Digital Principles and Applications, Malvino and Leach, Tata McGrawHill 2. Modern Digital Electronics, R. P. Jain, Tata McGrawHill	

Course Code	SKILL ENHANCEMENT COURSE SEM – I	Credits	Lectures/ Week
26ITSE151	Paper I - Office Tools for Data Management	2	2
Course Objectives(CO): Students will be able to: CO1: Utilize advanced word processing features to create structured technical reports with automated navigation elements like Table of Contents and Table of Figures. CO2: Interpret automated communication workflows using Mail Merge logic and rules based on specific recipient criteria. CO3: Develop complex data manipulation and arithmetic calculations in Excel using mathematical, statistical, and text-based functions. CO4: Examine interactive digital presentations and relational databases that enforce referential integrity and support advanced query engineering.			
Course Outcomes (OC): Students can: OC1: Recall structural components of technical reports and explain the functional necessity of automated navigation elements for document standardization. OC2: Illustrate automated communication workflows by implementing specific Mail Merge logic and filtering rules to satisfy complex recipient criteria. OC3: Construct multi-faceted datasets to differentiate between statistical and logical requirements, ensuring the correct selection of advanced Excel functions for accurate data modeling. OC4: Analyze interactive presentations and relational schemas that validate referential integrity and support the investigation of data through advanced query engineering.			
1	Using Ms-Word - Introduction to Ms Word and getting familiar with word ribbon and writing a Resume. - Create a 5 technical report with multiple heading levels, automated Table of Contents and Page Numbering (Roman for Preface, Arabic for Body). - Insert Captions for all images and tables, then generate an automated Table of Figures.		
2	Advanced Mail Merge & Logic Create a standardized "Event Invitation" and link it to an Excel recipient list containing at least 10 entries. Use Mail Merge Rules (If...Then...Else) to insert different messages based on a "Gender" or "Membership Status" field.		
3	Using Ms-Excel - Enter marks for 5 subjects for 10 students. Calculate the Total Marks using =SUM(). Average Percentage using =AVERAGE() and find the Highest and Lowest marks in the class using min, max. - To manipulate non-numeric data- Create a list of employees with their "First Name" and "Last Name" in separate columns. Use =CONCAT() or the & operator to join them into a "Full Name" column. Use =TODAY() to show the current date at the top of the sheet. Use =DAYS() to calculate how many days have passed between an employee's "Hire Date" and today.		

4	Simple Inventory Filter (Sorting & Data Cleaning) To organize data for better readability-Create a list of 20 items with categories (e.g., Electronics, Stationery, Furniture) and prices. Use Sort & Filter to arrange items alphabetically by category. • Use Conditional Formatting to highlight any item with a price greater than 500 in Red. • Freeze the top row (View > Freeze Panes) so the headers stay visible while scrolling.
5	Graphs and static dashboard in excel To create a Static Business Dashboard in Microsoft Excel by implementing charting techniques, data formatting, and visual hierarchy to summarize complex datasets.
6	Presentation using Ms PowerPoint - Introduction to Ms Powerpoint software and getting familiar with Powerpoint ribbon. - To design and develop a professional, multi-slide electronic presentation using Microsoft PowerPoint that demonstrates proficiency in: Structural Layouts, SmartArt graphics, Multimedia Integration, Dynamic Effects.
7	Master Slide Architecture - Design a custom Slide Master with unique layouts, placeholders for code snippets, and consistent branding. - Create a navigation system using Hyperlinks and Action Buttons to make a non-linear "Interactive Quiz" presentation.
8	Database using Ms Access - Getting familiar with MS Access Ribbon options. - With the help of access wizard Create Database. Add 2 Tables in each table and add 5 columns of different data types. Add 10-10 entries in each table. Add necessary integrity constraints. - Use the Table Wizard to create a table. Add and delete fields in an existing table. Establish an input mask and validation rule for fields within a table. Switch between the Design and Datasheet views of a table.
9	Schema Design & Relationships Create a "College Management" database with three tables: <i>Students</i> , <i>Courses</i> , and <i>Enrollments</i> . Define appropriate Data Types (Short Text, Date/Time, AutoNumber). Establish One-to-Many Relationships and enforce Referential Integrity to prevent "orphan" enrollment records.
10	Query Engineering (SQL & Logic) Write a Select Query with multiple criteria (e.g., Students from "Mumbai" enrolled in "IT") and sort the results. Create a Calculated Field within a query (e.g., TotalFees: [BaseFee] * 1.18 for GST) and build a Totals Query to sum fees by department.
Textbooks: 1. Microsoft Office 365 For Beginners (2026 Edition) by <i>Maverick Dotey</i> 2. Access 2016 in easy steps, by Mike McGrath, In Easy Steps, 1st Edition, 2017	

Additional References:

1. Microsoft Office Step by Step (Office 2021 and Microsoft 365) by *Joan Lambert & Curtis Frye* (Pearson Education)
2. Step by Step Microsoft Access 2013, by Joyce Cox and Joan Lambert, 1st Edition, Microsoft Press, 2013
3. Access 2019 Bible, by Michael Alexander, Richard Kusleika, Wiley, 1st Edition, 2018

Course Code	SKILL ENHANCEMENT COURSE SEM – I	Credits	Lectures/ Week
26ITSE152	Paper II- Fundamentals of Telecommunication Systems	2	2
Course Objectives(CO): Students will be able to: CO1: Perform transformations on independent and dependent variables (scaling, shifting, and reversal) for both continuous and discrete domains. . CO2: Represent complex, arbitrary functions and sequences through the decomposition of elementary signals (unit impulse, step, and exponential functions). CO3: Evaluate the historical progression of wireless communication, specifically the transition from LTE (4G) to the "10 pillars" of 5G technology. CO4: Design solutions for capacity enhancement using small-cell densification to meet increasing mobile data demands while addressing implementation challenges.			
Course Outcomes (OC): Students can: OC1: Recall the fundamental definitions of signals and systems and identify the 10 pillars of 5G architecture. OC2: Explain the properties of continuous and discrete-time systems and summarize the historical evolution of wireless communication. OC3: Build mathematical representations of arbitrary functions and utilize 5G networking reconfiguration techniques to support virtualization OC4: Examine the relationship between mobile data demand and capacity to simplify complex resource over-provisioning challenges.			
1	Signals and Systems: Introduction, Signals, Systems, Why Signals and Systems? Preliminaries, Overviews, Sets, Mappings, Functions, Sequences, Abuse of notations, System operators, Basic Signal Properties.		
2	Continuous-Time Signals and Systems: Overview, Transformations of the Independent Variable, Transformations and the Dependent Variable		
3	Properties of functions, Elementary functions, Representation of Arbitrary Functions using elementary functions, Continuous -time systems, Properties of systems		
4	Discrete-Time Signals and Systems: Overview, Transformations of the independent variable, Properties of Sequences		
5	Elementary Sequences, Representing Arbitrary Sequences Using Elementary Sequences, Discrete-Time Systems, Properties of Systems		
6	Drivers for 5G: Introduction, Historical trend of Wireless Communication, Evolution of LTE technology to beyond 4G, 5G Roadmap, 10 pillars of 5G, 5G in Europe, 5G in Asia, 5G in Asia, 5G Architecture		
7	The 5G Internet: Introduction, Internet of Things and Context- Awareness, Networking Reconfiguration and Virtualisation Support		
8	Mobility, Quality of Service Control, Emerging Approach for Resource Over-Provisioning		
9	Small Cells for 5G Mobile Networks: Introduction, What are small cells? Capacity Limits and Achievable Gains with Densification		

10	Mobile Data Demand, Demand vs Capacity, Small-Cell Challenges, Conclusions and future directions
Textbooks: 1. Signals and Systems, Michael Adams, University of Victoria, 3rd Edition, 2012 2. Fundamentals of 5G Mobile Networks, Edited by Jonathan Rodriguez, Wiley Publications, 2015	

SEMESTER-II

Course Code	MAJOR SEM – II	Credits	Lectures /Week
26ITMJ211	Paper I- Object Oriented Programming using C++	2	2
Course Objectives (CO): Students will be able to: CO1:Introduce the foundational principles of Object-Oriented Programming, including objects, classes, data abstraction, and encapsulation. CO2:Explain the concepts of constructors, destructors, inheritance hierarchies, and the mechanisms of polymorphism. CO3:Demonstrate the application of virtual functions, exception handling mechanisms, and file operations in C++. CO4:Develop analytical skills for structuring complex problem solutions using advanced object-oriented methodologies.			
Course Outcomes (OC): Students can: OC1:Define and recall core OOP principles, such as classes, objects, message passing, and encapsulation. OC2:Explain how various constructors, destructors, inheritance types, and polymorphic concepts function within C++ programs. OC3:Apply concepts of virtual functions, throw and catch exception handling mechanisms, and file manipulations to solve given programming tasks. OC4:Analyze problem statements to determine the appropriate use of advanced OOP features, such as multiple inheritance and abstract classes, for optimal code design.			
Unit	Topics	No of Lectures	
I	Object Oriented Methodology: Introduction, Advantages and Disadvantages of Procedure Oriented Languages, Application of OOPS, Principles of OOPS: Objects, Classes, Data Abstraction and Data Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing. Classes and Objects: Simple classes (Class specification, class members accessing), Defining member functions, passing object as an argument, Returning object from functions, friend classes, friend function. Constructors and Destructors: Introduction, Default Constructor, Parameterized Constructor and examples, Destructors. Program development using Inheritance: Introduction, Advantages provided by inheritance, choosing the access specifier, Derived class declaration, derived class constructors, class hierarchies, multiple inheritance, multilevel inheritance, hybrid inheritance.	15	

II	Polymorphism: Concept of function overloading, overloaded operators, overloading unary and binary operators. Virtual Functions: Introduction and need, Pure Virtual Functions, this Pointer, abstract classes, virtual destructors. Exception Handling: Introduction, Exception Handling Mechanism, Concept of throw & catch with example. Working with Files: Introduction, File Operations, Various File Modes, File Pointer and their Manipulation.	15
Textbooks: 1. Object-oriented Programming C++, Hari Mohan Pandey , Laxmi Publications 2. C++ Programming: An Object-Oriented Approach, Behrouz A. Forouzan, Richard F. Gilberg , McGraw-Hill Education 3. C++ How to Program , Paul Deitel, Harvey Deitel Additional References: 1. Object Oriented Programming in C++ , E Balagurusamy 2. Object-Oriented Programming in C++ , Robert Lafore, Pearson Education. 3. Programming with ANSI C++ , Bhushan Trivedi 4. Demystified Object- Oriented Programming with C++, Dorothy R. Kirk		

Course Code	MAJOR SEM – II Web Designing	Credits	Lectures /Week
26ITMJ212	Paper II- Web Designing	2	2
Course Objectives(CO): Students will be able to CO1: Create web pages using HTML5 with proper structure, text formatting, links, tables, forms, images, and multimedia. CO2: Use CSS to style web pages, including fonts, colors, layout, spacing, alignment, and borders. CO3: Apply JavaScript for interactivity using variables, functions, operators, control structures, objects, and events. CO4: Develop interactive web applications using DOM, jQuery, JSON, cookies, and multimedia integration.			
Course Outcomes (OC): Students can: OC1: Recall basic web concepts including HTML5 structure, tags, formatting, lists, hyperlinks, CSS basics, JavaScript syntax, operators, and control structures. OC2: Explain HTML5 and CSS concepts for web page creation including structure, styling, graphics, forms, and multimedia. OC3: Apply JavaScript concepts to build interactive web pages using functions, events, objects, arrays, and control structures. OC4: Analyze and use jQuery and JSON for DOM manipulation, event handling, and data exchange in web applications.			
Unit	Topics	No of Lectures	
I	Introduction to HTML5: HTML basics and tags, Document structure and page title, Text formatting (headings, bold, italic, superscript, subscript, monospace), Lists and backgrounds (bulleted, numbered, definition lists, colors, special characters, horizontal lines), Hyperlinks and anchors (web pages, email links, internal links). Style Sheets and Graphics: Introduction to Style Sheets, Understanding Styles, Style Rules, Nested Tags, Hyperlinks Styling, External Style Sheets. Formatting Text using Style Sheets: Font Family, Font Size and Color, Bold and Italics, Strikethrough and Underlining, Inline Spans, Letter Spacing, Paragraph Formatting, Indentation, Borders, Text Alignment. Displaying Graphics: Graphics Formats, Image Insertion, Layout and Size, Alt Text, Captions, Navigation, Image Maps,	15	

	Tables, Borders, Padding, Alignment. Creating User Forms and Multimedia: Basic Forms, HTML5 Input Types, Audio and Video in HTML5, Video Tag, Embed Tag, Audio Tag, Multimedia Integration.	
II	JavaScript: Introduction to Variables, Statements, Operators, Comments, Functions, Expressions, Events, Strings and Numbers with Methods, Control Structures (Conditions, Switch, Loops, Break). JavaScript Operators: Arithmetic, Assignment, Comparison, Logical, Bitwise. Statements: Conditional (if-else, switch), Loops (while, do-while, for, for-in, for-of), Loop Control (break, continue, labels). JavaScript Objects: User-defined objects, Native objects (Array, String, Date, Math, Number, RegExp), Cookies. Events and Event Handlers: HTML and DOM events, Event listeners, Common events (click, load, key, mouse, form, focus, resize, submit, etc.). JavaScript Libraries and Data Handling: jQuery (selection, events, effects, DOM manipulation, plugins), JSON (syntax, data types, objects, arrays, parsing, JSON vs XML, data interchange, JSONP).	15
Textbooks: 1. Step by Step HTML5 by Faithe Wempen, Microsoft Press, 2011 2. The Complete Reference HTML & CSS, Thomas A. Powell. McGrawHill, 5 th Edition, 2010 3. The Complete Reference JavaScript Thomas A. Powell & Fritz Schneider McGrawHill 3rd 2012 Additional References: 1. Learning Web Design: A Beginner's Guide to Html, CSS, JavaScript, And Web Graphics, Jennifer Niederst Robbins, O'Reilly, 5th Edition, 2018. 2. HTML 5 for Web Designers (By: Jeremy Keith) – http:// freepdf-books.com		

Course Code	Major Practical SEM – II	Credits	Lectures/ Week
26ITMJP21	Practical A+B- A. Object Oriented Programming using C++ B. Web Designing	2	2
Course Objectives (CO): Students will be able to: CO1:Provide hands-on familiarity with basic C++ syntax, class structures, and object instantiation. CO2:-Facilitate the understanding of specialized functions, such as friend functions and constructors, through guided coding exercises. CO3:Guide the practical implementation of operator overloading, method overriding, and various inheritance types in executable code. CO4:Foster debugging and program evaluation skills by implementing robust exception handling and multi-file operations.			
Course Outcomes (OC): Students can: OC1:Write, compile, and execute standard C++ code to reproduce basic class and object structures. OC2:Demonstrate the working of member functions, friend functions, and constructors by interpreting and modifying given code structures. OC3:Implement C++ programs that actively utilize operator overloading, virtual functions, and different forms of inheritance. OC4:Analyze, debug, and test complex C++ applications to ensure error-free exception handling and accurate file read/write operations.			
Practical A- Object Oriented Programming using C++			
1	a. Write a C++ program to create a simple calculator. b. Write a C++ program to convert seconds into hours, minutes and seconds. c. Write a C++ program to find the volume of a square, cone, and rectangle.		
2	a. Write a C++ program to find the greatest of three numbers. b. Write a C++ program to find the sum of even and odd n natural numbers c. Write a C++ program to generate all the prime numbers between 1 and n, where n is a value supplied by the user 3.		

3	a. Write a C++ program using classes and object Student to print the name of the student, roll_no. Display the same. b. Write a C++ program for Structure bank employees to print the name of the employee, account_no. & balance. Display the same also display the balance after withdrawal and deposit 30 Hrs. c. Design the class Demo which will contain the following methods: readNo(), factorial() for calculating the factorial of a number, reverseNo() will reverse the given number, isPalindrome() will check the given number is palindrome, isArmstrong() which will calculate the given number is armStrong or not. WhereReadNo() will be a private method. d. Write a program to demonstrate function definition outside class and accessing class members in function definition.
4	a. Write a friend function for adding the two complex numbers, using a single class b. Write a friend function for adding the two different distances and display its sum, using two classes. c. Write a friend function for adding the two matrices from two different classes and display its sum. d. Write a Program to find Maximum out of Two Numbers using the friend function. Note: Here one number is a member of one class and the other number is a member of some other class.
5	a. Design a class Complex for adding the two complex numbers and also show the use of constructors. b. Design a class Geometry containing the methods area() and volume() and also overload the area()function. c. Design a class StaticDemo to show the implementation of static variables and staticfunction. d. Write a C++ program to overload new/delete operators in a class. e. Write a C++ Program to generate Fibonacci Series by using Constructor to initialize the Data Members
6	a. Overload the operator unary(-) for demonstrating operator overloading b. Overload the operator + for adding the timings of two clocks, And also pass objects as an argument. c. Overload the + for concatenating the two strings. For e.g "Py" + "thon" =Python

7	a. Implement the concept of method overriding. b. Show the use of virtual function c. Show the implementation of abstract class.
8	a. Write a C++ Program that illustrates single inheritance. b. Write a C++ Program that illustrates multiple inheritance. c. Write a C++ Program that illustrates multi-level inheritance. d. Write a C++ Program that illustrates Hierarchical inheritance.
9	a. Show the implementation of exception handling. b. Show the implementation for exception handling for strings. c. Show the implementation of exception handling for using the pointers.
10	a. Design a class FileDemo opens a file in read mode and displays the total number of words and lines in the file. b. Design a class to handle multiple files and file operations c. Design an editor for appending and editing the files
Practical B- Web Designing	
Course Objectives (CO): Student will be able to: CO1: Design static web pages using HTML with text formatting, lists, tables, forms, hyperlinks, multimedia, and basic layout techniques. CO2: Apply CSS (inline, internal, and external) to improve web page presentation through styling, formatting, and layout control. CO3: Implement client-side scripting using JavaScript for validation, event handling, and basic problem-solving. CO4: Use jQuery and JSON for DOM manipulation, event handling, data exchange, and dynamic web content development.	
Course Outcomes (OC): Students can OC1: List and outline HTML tags, CSS properties, JavaScript syntax, events, and JSON structures used in web development. OC2: Illustrate the use of hyperlinks, lists, tables, forms, multimedia, and style sheets to organize and present web content effectively. OC3: Apply JavaScript for computations, validations, and event-driven interactions, and use jQuery for DOM operations. OC4: Examine and integrate JSON data, dynamic elements, and user interface components to build structured and interactive web pages.	
1	Use of Basic and Advanced Tags, Lists and Backgrounds a. Design a web page using basic and advanced text formatting tags. b. Design a web page using ordered, unordered list and description list.

	c. Write an HTML code to display your CV on a web page.
2	Creating Hyperlinks, Anchors and style sheets a. Design a web page with links to different pages and allow navigation between web pages. b. Design a web page that automatically redirects the user to Other Content. c. Design a web page by Creating and Linking to External Style Sheets.
3	Formatting Text and Paragraph by Using Style Sheets and displaying graphics a. Design a web page using Indenting Paragraphs, Applying Border to a Paragraph and Specifying Horizontal Alignment of a Paragraph. b. Implement a web page by inserting an image and controlling the image size and padding. c. Design a web page by making an image as a hyperlink.
4	Tables, Page Layout and Navigation a. Display a time table and display it in tabular format b. Design a table by merging the table cells c. Design a web page with Image Map
5	Forms and Introducing video and audio tags a. Design a web page with a form that uses all types of controls. b. Design an admission form for any course in your college with text, pass word fields, check boxes, radio button and reset button. c. Design a web page embedding image, audio and video.
6	Basics of JavaScript a. Using JavaScript, design a web page to accept a number from the user and print its Factorial. b. Using JavaScript, a web page that prints Fibonacci series/any given series. c. Write a JavaScript program to display all the prime numbers between 1 and 100.
7	Java Script: Validating User fields a. Demonstrate the use of Document object methods. b. Design a web form and implement JavaScript validation for input fields, drop-down lists, checkboxes, radio buttons, and multi-select boxes. c. Write a Java script to prompt for the user's name and display it on the screen.
8	Java Script: Handling the events

	Create a web page to demonstrate handling of different JavaScript events including mouse, keyboard, form, and window events.
9	JQuery a. Create a web page to demonstrate jQuery effects and event handling using different elements. b. Write a jQuery program to perform DOM traversal, manipulation, and handle data using the on() method.
10	JSON Basics and Working with JSON a. Create and parse JSON data, and display it on a web page using JavaScript. b. Read JSON data (including arrays and objects) from a file, convert it into a JavaScript object, and display it on a web page.
Textbooks: 1. Object-oriented Programming C++, Hari Mohan Pandey 2. C++ Programming: An Object-Oriented Approach, Behrouz A. Forouzan, Richard F. Gilberg 3. C++ How to Program, Paul Deitel, Harvey Deitel Additional References: 1. Object Oriented Programming in C++, E Balagurusamy 2. Object-Oriented Programming in C++ by Robert Lafore 3. Programming with ANSI C++, Bhushan Trivedi 4. Demystified Object- Oriented Programming with C++, Dorothy R. Kirk 5. Learning Web Design: A Beginner's Guide to Html, CSS, JavaScript, And Web Graphics, Jennifer Niederst Robbins, O'Reilly, 5th Edition,2018.	

Course Code	MINOR SEM – II	Credits	Lectures / Week
26ITMR221	Paper I- Fundamentals of Mathematics	2	2
Course Objectives(CO): Student will be able to CO1: Define and distinguish between different types of relations (Equivalence, Partial Ordering) and their pictorial representations. . CO2: Rigorously prove mathematical statements using induction and set algebra. CO3: Design and analyze efficient paths and connections using graph-based algorithms. CO4: Evaluate the computational efficiency of functions and recursive processes.			
Course Outcomes (OC): Students can OC1: Recall basic definitions of graph types (complete, bipartite, null) and tree structures OC2: Explain the principles of mathematical induction and the handshaking lemma in graph theory OC3: Utilize the Addition and Product rules of counting alongside Kruskal’s and Prim’s algorithms to find optimal solutions OC4: Examine the complexity of algorithms and the composition of relations			
Unit	Topics	No of Lectures	
I	Set Theory Introduction:- Sets and Elements, Subsets, Venn Diagrams, Set Operations, Algebra of Sets, Duality, Finite Sets, Counting Principle, Classes of Sets, Power Sets, Partitions, Mathematical Induction Relations:- Introduction, Product Sets, Relations, Pictorial Representations of Relations, Composition of Relations, Types of Relations, Closure Properties, Equivalence Relations, Partial Ordering Relations. Functions and Algorithms: Introduction, Functions, One-to-One, Onto, and Invertible Functions, Mathematical Functions, Exponential and Logarithmic Functions, Sequences, Indexed Classes of Sets, Recursively Defined Functions, Cardinality, Algorithms and Functions, Complexity of Algorithms	15	
II	Counting Principle Cardinality of sets, Basics of Counting: Addition rule, Product rule, Inclusion and Exclusion Principle, Mathematical Induction:1st and 2nd principle of induction Introduction to Graphs and Operations on Graphs Definition and examples of graphs, Handshaking lemma and its corollaries. Types of graph, Complete graph, bipartite graph, Regular graph, Null graph. Isomorphism of graphs, Adjacency and Incidence Matrix of a Graph.,Kruskal's Algorithm, Prim's algorithm,Dijkstra's Algorithm,Trees and traversing	15	
Textbooks: 1.Kenneth H.Rosen. Discrete Mathematics and its applications. (7th edition) McGraw-Hill Higher Education, 2017. 2.Bernard Kolman, Robert C.Busby , and Sharon cutler Ross. Discrete Mathematical Structures (6th edition). Prentice-Hall, Inc. Upper Saddle River, NJ, USA, 2003. Additional References: 1. John Clark and Derek Holton, a first look at Graph Theory, 2013.			

Course Code	OPEN ELECTIVE SEM – II	Credits	Lectures/ Week
26ITOE231	Paper I- Research Foundation & Statistics	2	2
Course Objectives(CO): Student will be able to CO1:To gain knowledge of the basic concepts of research methodology and statistics. CO2:To develop an understanding of demand, supply, cost-revenue, market structures, trade cycles, inflation and economic policies related to the Indian economy. CO3: To learn to use research and statistics concepts in practical business situations. CO4: To develop students' understanding of research methods and statistical tools for collecting, analyzing, and interpreting data effectively.			
Course Outcomes (OC): Students can OC1:Identify and recall the various terms associated with research methodology and statistics. OC2:Describe and explain the various concepts, theories, terminologies and methods used in research and statistics. OC3:Apply suitable methods of research and statistics to solve practical scenarios and numerical. OC4:Analyze and demonstrate various research & sample designs and methods of data collection concerning genuine situations			
Unit	Topics	No of Lectures	
I	1.1 Meaning and characteristics of the research; types of research, research problem identification, statement of problem, research gap, research objectives and research questions, types of variables, Stages in the research process. 1.2 Review of Literature. 1.3 Hypothesis - Meaning, Nature, Significance, Types of Hypotheses, Sources. 1.4 Research design – Meaning, Need and Importance, Steps in research design, Essentials of a good research design, Areas / Scope of research design and Types - Descriptive, Exploratory and causal. Qualitative, Quantitative and mixed methods Research. 1.5 Types of data - Primary and Secondary data sources. Methods of collection of primary data (Observation, Experiments, Interview & Survey) and secondary data.	15	
II	2.1 Population and Sampling - meaning of sample and sampling, sampling frame, sampling error. 2.2 Methods of sampling-i) Non-Probability Sampling– Convenient, Judgment, Quota, Snowball. ii) Probability sampling– Simple Random, Stratified, Cluster, Multi-Stage. 2.3 Frequency Distribution – Discrete & Continuous, Tabulation and Presentation of Data – Bar diagrams, Pie Chart, Histogram, Frequency Polygon, Line graph. (Numerical)	15	

	2.4 Measures of Central Tendency – Mean, Median & Mode. (Numerical) 2.5 Introduction to SPSS with the help of business research surveys.	
Textbooks: 1. Research Methodology, C R Kothari, 2019, New Age Publication. 2. Business Research Methods, Donald R Cooper & Pamela Schindler, 2022, Tata McGraw Hill 3. Statistics for management, Levin and Reuben, 2017, Prentice Hall. Additional References: 1. Statistics for Business & Economics, David R Anderson & Dennis J Sweney, 2022, Thompson Publication. 2. Fundamental of Statistics, S C Gupta, 2020 Himalaya Publication House. 3. Research Methodology: A Step-by-Step Guide for Beginners, Ranjit Kumar, SAGE Publications		

Course Code	VOCATIONAL SKILL COURSE SEM – II	Credits	Lectures/ Week
26ITVSC241	Paper I- Assembly Language Programming	2	2
Course Objectives(CO): Student will be able to: CO1: Define the fundamental data transfer operations, including direct/indirect addressing to store, exchange, and manipulate data between registers and specific memory locations. CO2: Execute fundamental data transfer operations, including direct/indirect addressing to store, exchange, and manipulate data between registers and specific memory locations. CO3: Apply techniques for packing and unpacking BCD (Binary Coded Decimal) numbers and performing arithmetic operations on non-binary data formats. . CO4: Design and debug structured programs involving loops, counters, and conditional branching to solve computational problems such as sorting arrays, calculating factorials, and generating mathematical series			
Course Outcomes (OC): Students can: OC1: Recall fundamental concepts of assembly language programming OC2: Explain and interpret the working of assembly instructions, data transfer techniques, arithmetic operations, and memory handling mechanisms. OC3: Apply assembly language programming concepts to develop programs for arithmetic operations, data manipulation, looping, string handling, and memory operations. OC4: Analyze assembly language programs to identify logical errors, optimize performance, and evaluate different approaches for solving computational problems.			
1	Perform the following Operations related to memory locations. a. Store the data byte 32H into memory location 4000H. b. Exchange the contents of memory locations 2000H and 4000H		
2	Simple assembly language programs. a. Subtract the contents of memory location 4001H from the memory location 2000H and place the result in memory location 4002H. b. Subtract two 8-bit numbers. c. Add the 16-bit number in memory locations 4000H and 4001H to the 16-bit number in memory locations 4002H and 4003H. The most significant eight bits of the two numbers to be added are in memory locations 4001H and 4003H. Store the result in memory locations 4004H and 4005H with the most significant byte in memory location 4005H.		
3	Packing and unpacking operations. Pack the two unpacked BCD numbers stored in memory locations 4200H and 4201H and store result in memory location 4300H. Assume the least A significant digit is stored at 4200H.		
4	Register Operations a. Write a program to shift an eight bit data four bits right. Assume that data is in register C. b. Program to shift 16-bit data 1 bit left. Assume data is in the HL register pair		
5	Multiple memory locations. a. Calculate the sum of a series of numbers. The length of the series is in memory location 4200H and the series begins from memory location		

	4201H. a. Consider the sum to be an 8 bit number. So, ignore carries. Store the sum at memory location 4300H. b. Consider the sum to be a 16 bit number. Store the sum at memory locations 4300H and 4301H. b. Multiply two 8-bit numbers stored in memory locations 2200H and 2201H by repetitive addition and store the result in memory locations 2300H and 2301H.
6	Calculations with respect to memory locations. a. Write a program to sort given 10 numbers from memory location 2200H in the ascending order. b. Calculate the sum of a series of odd numbers from the list of numbers. The length of the list is in memory location 2200H and the series itself begins from memory location 2201H. Assume the sum to be 16-bit. Store the sum at memory locations 2300H and 2301H.
7	Assembly programs on memory locations. a. Write an assembly language program to generate Fibonacci numbers. b. Program to calculate the factorial of a number between 0 to 8.
8	A list of 50 numbers is stored in memory, starting at 6000H. Find number of negative, zero and positive numbers from this list and store these results in memory locations 7000H, 7001H, and 7002H respectively
9	String operations in assembly programs. Divide the 16-bit unsigned number in memory locations 2200H and 2201H (most significant bits in 2201H) by the B-bit unsigned number in memory location 2300H store the quotient in memory location 2400H and remainder in 2401H
10	Operations on BCD numbers. Write an assembly language program to multiply 2 BCD numbers
Textbooks: 1. 8080A/8085 Assembly Language Programming, Lance A. Leventhel, Osborne, 1978 Additional References: 1. Microprocessors Architecture, Programming and Applications with the 8085, Fifth Edition, Penram Publications, 2012	

Course Code	SKILL ENHANCEMENT COURSE SEM – II	Credits	Lectures /Week
26ITSE251	Paper I - PL/SQL	2	2
Course Objectives(CO): Student will be able to: CO1: Define and implement basic PL/SQL blocks, variables, and sequences to establish foundational interaction with the Oracle Server. CO2: Illustrate control structures and conditional logic (Loops, If-Else, Case) to manage program execution and computational flow. CO3: Develop explicit cursors and handle system/user-defined exceptions to process data row-by-row and maintain application stability. CO4: Analyze modular database objects including Procedures, Functions, Packages, and Triggers to automate and secure business logic.			
Course Outcomes (OC): Students can: OC1: Identify the architecture of PL/SQL blocks and describe how variables and sequences are used to interact with database schemas. OC2: Explain complex logic patterns by implementing loops and conditional branching to solve specific algorithmic problems within the database. OC3: Construct cursor attributes and interpret runtime error codes to formulate robust exception-handling routines for large-scale data processing. OC4: Examine integrated Packages and Triggers to validate data integrity and investigate database events for automated auditing.			
1	PL/SQL Basics- Use of variables, Write executable statement, Interacting with Oracle Server, Create anonymous PL/SQL block,Sequences.		
2	Control Structure in PL/SQL- Using while loop, Do loop, For loop, Use of GOTO statements.		
3	Create conditional statement using PL/SQL- Using if statement, Using if else statement, Using elsif ladder, Using case expression.		
4	Create cursor in PL/SQL- Implicit cursor, Explicit cursor, Parameterized cursor.		
5	Collection and Composite Data Types - Working with Collections,Working with Composite Data Types.		
6	Creation of Procedures in PL/SQL.		
7	Functions in PL/SQL.		
8	Creation of Trigger – Create Row level trigger, Create Statement level trigger, Create instead of trigger		
9	Handling exceptions- Creation of user defined exception, Creation of system defined exception.		
10	Creation of Package in PL/SQL.		
Textbooks:			

- 1, Programming with PL/SQL for Beginners , H. Dand, R. Patil and T. Sambare, X-Team
2. Oracle pl/sql Programming ,Feuerstein, S., & Pribyl, B. , " O'Reilly Media, Inc."

Additional References:

1. Oracle Database PL/SQL Language Reference, 12c Release 1 (12.1) E50727-04 , Alpern, D., Belden, E., Agrawal, S., Baer, H., Castledine, S., Chang, T., & Yang, M.
2. Oracle PL/SQL for dummies , Rosenblum, M., & Dorsey, P. (2006), John Wiley & Sons.
3. PL/SQL Programming ,Ivan Bayross, BPB

Course Code	SKILL ENHANCEMENT COURSE SEM – II	Credits	Lectures /Week
26ITSE252	Paper II- Web Programming	2	2
Course Objectives(CO): Student will be able to CO1: Create well-formed XML documents validated by Internal and External Document Type Definitions (DTD) CO2: Process and validate HTML form data on the server to facilitate user interaction. CO3: Implement secure User Authentication systems to protect web resources CO4: Construct complex SQL queries to filter and retrieve specific datasets (e.g., range-based filtering) and display them in structured tabular formats.			
Course Outcomes (OC): Students can OC1: Remember the fundamental syntax, built-in objects, and protocols of web technologies including JavaScript, XML, and PHP OC2: Understand the relationship between client-side scripting, server-side processing, and database management OC3: Apply programming logic to solve mathematical problems and manage data persistence using cookies, sessions, and file handling OC4: Analyze the requirements for responsive web design and database schemas to develop integrated, data-driven web applications			
1	Write JavaScript code for a. Demonstrating different JavaScript Objects such as String, RegExp, Math, Date b. Demonstrating different JavaScript Objects such as Window, Navigator, History, Location, Document c. Storing and Retrieving Cookies		
2	Create a XML file with Internal / External DTD and display it using a. CSS b. XSL		
3	Write PHP scripts for- Performing certain mathematical operations such as calculating factorial / finding Fibonacci Series / Displaying Prime Numbers in a given range / Evaluating Expressions		
4	Write PHP scripts for a. Retrieving data from HTML forms b. Working with Arrays c. Working with Files (Reading / Writing)		
5	Advanced PHP a. Write a PHP program to demonstrate use of sessions and cookies. b. Write a PHP program to demonstrate use of filters.		
6	PHP and MySQL a. Write a PHP program to create: Create a database College b. Create a table Department (Dname, Dno, Number_of_faculty) c. Write a PHP program to create a database named “College”. Create a table named “Student” with following fields (sno,		

	sname,percentage). Insert 3 records of your choice. Display the names of the students whose percentage is between 35 to 75 in a tabular format.
7	Write a PHP program a. Update rows in a table b. Delete rows from a table
8	Design a PHP page for authenticating a user
9	Write PHP scripts for a. Storing and Retrieving Cookies b. Storing and Retrieving Sessions
10	Perform the following using Bootstrap: a. Create a responsive layout using the Bootstrap grid system b. Create a simple Bootstrap navbar with dropdown menus c. Create a basic Bootstrap form with validation.
Textbooks: 1. HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, 2ed, Dreamtech Press, 2016 2. Web Programming and Interactive Technologies, scriptDemics, StarEdu Solutions India, 2018 3. PHP: A Beginners Guide, Vikram Vaswani, TMH Additional References: 1. HTML, XHTML, and CSS Bible Fifth Edition, Steven M. Schafer, WILEY, 2011 2. Learning PHP, MySQL, JavaScript, CSS & HTML5, Robin Nixon, O'Reilly, 2018 3. PHP, MySQL, JavaScript & HTML5 All-in-one for Dummies, Steve Suehring, Janet Valade Wiley, 2018	

Evaluation Scheme for First Year Information Technology (UG) under NEP 2020 (4 credits)

I. Internal Evaluation for Theory Courses – 40 Marks

1) Continuous Internal Assessment (CIA) Assignment - Tutorial/ Case Study/ Project / Presentations/ Group Discussion / Ind. Visit. – 20 marks

2) Continuous Internal Assessment (CIA) ONLINE / OFFLINE Unit Test – 20 marks - 30 Minutes

II. External Examination for Theory Courses – 60 Marks

Duration: 2 Hours

Theory question paper pattern:

Question	Based on	Marks
Q.1	Unit I	15
Q.2	Unit II	15
Q.3	Unit III	15
Q.4	Unit IV	15

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be sub-divided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

**NOTE: To pass the examination, attendance is compulsory in both
Internal & External Theory Examinations.**

Evaluation Scheme for First Year Information Technology (UG) under NEP 2020 (2 credits)

I. Internal Evaluation for Theory Courses – 20 Marks

1) Continuous Internal Assessment (CIA) Assignment - Tutorial/ Case Study/ Project / Presentations/ Group Discussion / Ind. Visit. – 10 marks

2) Continuous Internal Assessment (CIA) ONLINE / OFFLINE Unit Test – 10 marks - 15 Minutes

II. External Examination for Theory Courses – 30 Marks

Duration: 1 Hour

Theory question paper pattern:

Question	Based on	Marks
Q.1	Unit I	15
Q.2	Unit II	15

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be sub-divided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

**NOTE: To pass the examination, attendance is compulsory in both
Internal & External Theory Examinations**

DES's Kirti M. Doongursee College (AUTONOMOUS), Dadar (W), Mumbai-28		
Regular / Additional / ATKT Examination		
Duration: 1 Hour		Max Marks: 30
Date: <i>(For office use)</i>	Time:	Code:
N.B.	i)	<i>All Questions are compulsory.</i>
	ii)	<i>Mixing of sub-questions is not allowed.</i>
	iii)	<i>Draw neat labeled diagrams wherever necessary.</i>

BT1: Remember BT2: Understand BT3: Apply BT4: Analyze

Q.1A	CO1	UNIT1	BT1		[04]
				OR	
Q.1B	CO1	UNIT1	BT1		[04]
Q.1C	CO2	UNIT1	BT2		[04]
				OR	
Q.1D	CO2	UNIT1	BT2		[04]
Q.1E	CO3	UNIT1	BT3		[04]
				OR	
Q.1F	CO3	UNIT1	BT3		[04]
Q.1G	CO4	UNIT1	BT4		[03]
				OR	
Q.1H	CO4	UNIT1	BT4		[03]
Q.2A	CO1	UNIT2	BT1		[04]
				OR	
Q.2B	CO1	UNIT2	BT1		[04]
Q.2C	CO2	UNIT2	BT2		[04]
				OR	
Q.2D	CO2	UNIT2	BT2		[04]
Q.2E	CO3	UNIT2	BT3		[04]
				OR	
Q.2F	CO3	UNIT2	BT3		[04]
Q.2G	CO4	UNIT2	BT4		[03]
				OR	
Q.2H	CO4	UNIT2	BT4		[03]

**FY Information Technology Evaluation pattern
and Question paper pattern for Semester End
Practical Examination of Major Course**

Internal Continuous Assessment: 40% (20 Marks)	Semester End Examination: 60% (30 Marks)	Duration for End semester examination
Viva/Assignment/ Objective question test /Small experiments (15 Marks), Overall performance (5 Marks) = 20 Marks	As per paper pattern	2 Hours

**FY Information Technology Evaluation pattern
and Question paper pattern for Semester End
Practical Examination of Vocational Skill
Courses and Skill Enhancement Courses**

Internal Continuous Assessment: 40% (20 Marks)	Semester End Examination: 60% (30 Marks)	Duration for End semester examination
Viva/ Assignment/ Objective question test /Small experiments (15 Marks), Overall performance (5 Marks) = 20 Marks	As per paper pattern	2 Hours

Signatures of Team Members

SR.No.	Name	Signature
1	Dr. Kimaya Shelar	
2	Dr. Aparna Vaidyanathan	
3	Dr. Pragati Thawani	
4	Mr. Tanesh Bhansali	
5	Dr. Ajay Barve	
6	Dr. Apurva Yadav	
7	Mr. Gaurav Salvi	
8	Ms. Kartikee Murkar	
9	Mr. Prateek Yadav	
10	Ms. Snehal Rane	

Letter Grades and Grade Points:

Semester GPA/ Programme CGPA Semester/ Programme	% of Marks	Alpha-Sign/ Letter Grade Result	Grading Point
9.00 - 10.00	90.0 – 100	O (Outstanding)	10
8.00 - < 9.00	80.0 - < 90.0	A+ (Excellent)	9
7.00 - < 8.00	70.0 - < 80.0	A (Very Good)	8
6.00 - < 7.00	60.0 - < 70.0	B+ (Good)	7
5.50 - < 6.00	55.0 - < 60.0	B (Above Average)	6
5.00 - < 5.50	50.0 - < 55.0	C (Average)	5
4.00 - < 5.00	40.0 - < 50.0	P (Pass)	4
Below 4.00	Below 40.0	F (Fail)	0
Ab (Absent)	-	Ab (Absent)	0

Justification for Bachelors in Information Technology

1.	Necessity for starting the course:	With the rapid digital transformation across all sectors, there is a continuous and growing demand for technically proficient IT professionals. This course is necessary to equip students with foundational knowledge in computing, modern programming languages, database management, and emerging technologies. It bridges the gap between theoretical computer science and applied industry practices, preparing students to contribute effectively to the digital economy.
2.	Whether the UGC has recommended the course:	Yes
3.	Whether all the courses have commenced from the academic year 2023-24.	The course has already commenced in the university and in the academic year 2023-24 it is restructured under NEP 2020
4.	The courses started by the University are self-financed, whether adequate number of eligible permanent faculties are available?:	This course is aided / self-financed based on the sanction given by University of Mumbai to affiliated colleges from time to time.
5.	To give details regarding the duration of the Course and is it possible to compress the course?:	The duration of the program is three years (6 semesters). It is not possible to compress the course.
6.	The intake capacity of each course and no. of admissions given in the current academic year:	120 per division
7.	Opportunities of Employability / Employment available after undertaking these courses:	Graduates of this program have diverse employment opportunities across IT firms, software development companies, corporate enterprises, and startups. Potential career roles include Software Developer, Web Developer, Database Administrator, System Analyst, Network Engineer, IT Support Specialist, and Quality Assurance Tester. Furthermore, students are well-prepared to pursue higher education (such as MSc IT or MCA) or entrepreneurship in the technology sector.