Diploma in Computer Applications (DCA)

PROGRAMME GUIDE

TABLE OF CONTENTS	
INTRODUCTION	3
PROGRAMME OUTCOMES	3
PROGRAMME SPECIFIC OUTCOMES	3
SALIENT FEATURES	3
PROGRAMME CODE	4
DURATION OF THE PROGRAMME	4
MEDIUM OF INSTRUCTION/EXAMINATION	4
PROGRAMME STRUCTURE	5
PROGRAMME SCHEME	5
SYLLABUS OF PROGRAMME	6-22

INTRODUCTION

The Programme is designed to build programming skills for developing efficient and resource optimized software/website/cloud/mobile applications.

PROGRAMME OUTCOMES

Program outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviours that students acquire in their matriculation through the program

1. **Domain Knowledge:** Apply and analyze knowledge of basic mathematics, science to solve the problems using information technology.
2. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of upcoming information technology changes.
3. **Modern tool usage:** Ability to use the modern programming languages, tools, techniques and skills necessary for design, develop and deploy software-based applications.
4. **Environment and sustainability:** Understand the impact of sciences and computers to craft solutions in a global, economic, environmental, and societal context.
5. **Life Long Learning:** Ability to analyze individual needs and engage in updating in the context of technological changes.

PROGRAMME SPECIFIC OUTCOMES

PSOs are statements that describe what the graduates of a specific engineering program should be able to do:

1. **PSO1:** Ability to analyze, interpret and present findings effectively using mathematical and communication skills.
2. **PSO2:** Understand the fundamentals and applications of programming, data structures, databases, networking, mobile computing, information security and data analysis.

SALIENT FEATURES

➢ **Contemporary Curriculum:** Instill knowledge in the major areas of computing such as Programming, Databases, and Web Development etc.

➢ **Holistic Development:** Participation in technical events, sports and cultural activities help in the holistic development of students

➢ **Software Skills:** Curriculum is equipped with 21st century digital technologies for game designing, animations and web development.

PROGRAMME CODE: DE1K24

DURATION OF THE PROGRAMME:

Minimum Duration: 1 years

Maximum Duration: 2 years

MEDIUM OF INSTRUCTION/EXAMINATION:

Medium of instruction and Examination shall be English.

PROGRAMME STRUCTURE			
Term	Core Courses (CR I, CR II, CR I+II – (8+4) 7 x 4 Credits	Ability Enhancement Courses (AECC) 3 x 4 Credits	Credits
I	Discipline Specific Core- I Discipline Specific Core- II Discipline Specific Core- III	AECC- I Environmental Sciences AECC-II English Communication Skills	20
II	Discipline Specific Core- IV Discipline Specific Core- V Discipline Specific Core- VI Discipline Specific Core- VII	AECC-III Advanced English Communication Skills	20
Total	28 Credits	12 Credits	40

DIPLOMAIN COMPUTER APPLICATIONS (DCA) PROGRAMME SCHEME (ODL)

COURSE CODE	COURSE TITLE	Cr.	CA	ETE (Th.)	ETE (Pr.)
TERM1					
DECAP170	FUNDAMENTALS OF INFORMATION TECHNOLOGY	4	30	40	30
DECAP172	PROGRAMMING METHODOLOGY	4	30	40	30
DEMTH136	DISCRETE STRUCTURES	4	30	70	0
DEENG139	ENGLISH COMMUNICATION SKILLS	4	30	70	0
DECHE110	ENVIRONMENTAL SCIENCES	4	30	70	0
TERM 2					
DECAP200	DATABASE MANAGEMENT SYSTEMS	4	30	40	30
DECAP202	OBJECT ORIENTED PROGRAMMING	4	30	40	30
DECAP256	COMPUTER NETWORKS	4	30	40	30
DECAP268	COMPUTER SYSTEM ARCHITECTURE	4	30	40	30
DEENG140	ADVANCED ENGLISH COMMUNICATION SKILLS	4	30	70	0

Course Code	DECAP170	Course Title	FUNDAMENTALS OF INFORMATION TECHNOLOGY

	WEIGHTAGE		
	CA	ETE(Th.)	ETE (Pr.)
	30	40	30

Course Outcomes:

CO1: Understand basic concepts and terminology of information technology.

CO2: Have a basic understanding of personal computers and their operations.

CO3: Understand various software and hardware, various security issues.

CO4: Familiarize students with complete fundamentals and the packages commonly used in computing software

CO5: Gain writing skills and various presentation aspects using word processing software

Unit No.	Contents
Unit1	**Computer Fundamentals:** Characteristics &Generation of Computers, Block diagram of Computer. Application of IT in various sectors. **Data Representation:** Binary Number System, Octal, Hexadecimal, decimal and their Conversion.
Unit2	**Memory:** Types, Units of memory, RAM, ROM, Secondary storage devices–HDD, Flash Drives, Optical Disks: DVD, SSD **I/O Devices**–Keyboard, Mouse, LCDs, Scanner, Plotter, Printer & Latest I/O devices in market
Unit3	**Processing Data:** Transforming data into information, how computers represent data, how computers process data, Machine cycles, Memory, Registers, The Bus, Cache Memory
Unit4	**Operating Systems:** operating system basics, Purpose of the operating system, types of operating system, providing a user interface, Running Programs, Sharing Information, Managing Hardware, Enhancing an OS with utility software.
Unit5	**Data Communication**: Local and Global reach of the network, Digital and Analog Transmission, Data communication with standard telephone lines and Modems, Using Digital Data Connections, Wireless networks
Unit6	**Networks:** Sharing data any time anywhere, uses of a network, Common types of a network, Hybrid Networks, how networks a restructured, Network topologies and Protocols, Network Media, Network Hardware
Unit7	**Graphics and Multimedia:** Understanding graphics File Formats, Getting Images into your Computer, Graphics Software, Multimedia Basics
Unit8	**Data Base Management Systems**: The Database, The DBMS, Working with a database, Databases at Work, Common Corporate Database Management Systems
Unit9	**Software Programming and Development:** What is computer Program, hardware/Software Interaction, planning a Computer Program, how programs Solve Problems
Unit 10	**Programming Languages and Programming Process:** Categories of Programming Languages, Machine and Assembly Language, Higher Level Languages, WWW development languages, The SDLC of Programming
Unit11	**Internet:** Basic Internet terms: Webpage, Website, Homepage, Browser, URL, Hypertext, ISP, Webserver, HTML, DHTML, XML, Introduction to client side and server-side scripting. **Applications:** WWW, e-mail, Instant Messaging, Internet Telephony, Videoconferencing, Web Browser & Its environment

Unit12	**Understanding The Need of Security Measures:** Basic Security Concepts, Threats to Users, Threats to Hardware, Threat to Data, Cyber Terrorism. **Taking Protective Measures:** Keeping your System Safe, Protecting Yourself, protecting your Privacy, Managing Cookies, Spyware and other BUGS, keeping your data secure, Backing Up data, Safeguarding your hardware
Unit13	**Cloud Computing and IoT**: SaaS, PaaS, IaaS, Public and Private Cloud; Virtualization, Virtual Server, Cloud Storage, Database Storage, Resource Management, Service Level Agreement, Basics of IoT and its applications.
Unit14	**Futuristic World of Data Analytics:** Introduction to Big data and Analysis Techniques: Elements, Variables, and Data categorization, Levels of Measurement, Data management and indexing, Introduction to statistical learning and overview of various tools used for data analysis.

LABORATORYWORK:

1. Hardware familiarizing with various I/O Peripheral devices, storage devices.
2. Familiarity with DOS, Implementing various internal and external commands in DOS.
3. **MS-Windows:** Familiarizing with windows operating system; using built-in accessories; managing files and folders using windows explorer; working with control panel; installing hardware and software.
4. MS-Office (or any other Office Suite), meaning and features, its components.
5. MS-Word (or any other word processor): Creating Document Files, Saving, Closing Files, Page Settings and Formatting Text. Spell Checking, Thesaurus, Creating Tables, Adding rows, columns. Printing Documents, Setting Print Settings, creating labels and mail merge, taking Printouts
6. MS-Excel – Working with worksheet, formulas & functions, Inserting charts, printing in Excel
7. MS-PowerPoint-Views, Designing, viewing, presenting Printing of Slides.
8. Internet: Navigating with Internet Explorer; surfing the net, using search engines; using email facility.

READINGS:

1. ITL Education Solutions Limited, "Introduction to Information Technology", Pearson Education, New Delhi
2. SAMS Teach Yourself Microsoft Office 2003 by Greg Perry
3. Peter Norton, "Introduction to Computers", Tata McGraw Hill Company, New Delhi.
4. Alexis Leon, Mathews Leon, "Fundamentals of Information Technology", Leon Tech world.

Course Code	DECAP172	Course Title	PROGRAMMING METHODOLOGY

	WEIGHTAGE		
	CA	ETE(Th.)	ETE (Pr.)
	30	40	30

Course Outcomes:

CO1: Develop programming skills and familiar with programming environment with C Program structure.

CO2: Declaration of variables and constants.

CO3: Understand arrays, its declaration and uses.

CO4: Implement, test, debug, and document programs in C

Unit No.	Content
Unit-1	**Introduction:** Introduction to Programming, Program concept, Characteristics of programing, stages in program development, Algorithms, Notations, Flowchart, and Types of programing methodologies.
Unit-2	**Constant and Variable:** Machine Language, Assembly Language, High Level Languages, C Program Structure, Character Set, Identifiers and Keywords, Constants and Variables.
Unit-3	**Unformatted and Formatted I/O:** Functions- printf(), scanf(), getchar(), putchar(), gets(), puts(), Expressions.
Unit-4	**Data Types & Operators:** Various data types - data range, size, Unary and Binary operators, Arithmetic Operators, Relational Operators, Logical Operators, Conditional Operators, Assignment Operator, Bitwise Operators.
Unit-5	**Control Structure:** Designing structured programs by using Top-Down design, Type conversion and Type modifiers, if statements - simple if, if-else, multiple if, if-else ladder, nested if, switch-case statement, while, do-while & for statements, break and continue statements, goto statement.
Unit-6	**Functions:** Function Definition and Prototypes, Scope rules - Local and Global scope of functions, Function arguments - passing arguments by value and passing arguments by reference, Return Type of function, Recursion, Library Functions.
Unit-7	**Arrays:** Declaring arrays in C, Defining and Processing of 1-dimensional and 2-dimensional arrays, Passing array as an argument to function, Multi-dimensional Arrays.
Unit-8	**Array Applications:** Sorting and Searching, Character Arrays.
Unit-9	**Strings:** Defining and Initializing strings, Reading and Writing strings, Processing of strings, String Library Functions - strcat(), strcpy(), strcmp(), strlen(), strrev().
Unit-10	**Storage Classes:** Storage class specifiers, Scope of a variable, Auto, Static, Extern, Register, Static variables and functions, Const Qualifier.
Unit-11	**Pointers:** Pointer data type, Pointer declaration, Initialization, accessing values using pointers, Pointer expressions and arithmetic, Operations on Pointers.
Unit-12	**Dynamic Memory Management:** Dynamic Memory Management functions, malloc(), calloc(), realloc() and free(), Pointers and arrays, Pointers and functions.
Unit-13	**Structures and Unions:** Structure declaration, definition and initialization, accessing structures in functions, Structures and Pointers, array of structures, nested structures, Self-referential structures, Unions.

Unit-14	**File Structure:** Categories of files, Opening and closing files, file opening modes, Text and binary files, Reading and writing in files, appending in files, Creating Header files, Preprocessor Directives and Macros.

LABORATORYWORK:

Data Types & Operators: Various data types - data range, size, Unary and Binary operators, Arithmetic Operators, Relational Operators, Logical Operators, Conditional Operators, Assignment Operator, Bitwise Operators.

Control Structure: if statements - simple if, if-else, multiple if, if-else ladder, nested if, switch-case statement, while, do-while & for statements, break and continue statements, goto statement.

Functions: Function Definition and Prototypes, Scope rules - Local and Global scope of functions, Function arguments - passing arguments by value and passing arguments by reference, Return Type of function, Recursion, Library Functions.

Arrays: Declaring arrays in C, Defining and Processing of 1-dimensional and 2-dimensional arrays, Passing array as an argument to function, Multi-dimensional Arrays.

Pointers: Pointer declaration, Initialization, accessing values using pointers, Pointer expressions and arithmetic, Operations on Pointers.

Structures and Unions: Structure declaration, definition and initialization, accessing structures in functions, Structures and Pointers, array of structures, nested structures, Self-referential structures, Unions.

File Structure: Opening and closing files, file opening modes, Text and binary files, Reading and writing in files, appending in files, Creating Header files.

READINGS:

1. C: THE COMPLETE REFERENCE by HERBERT SCHILDT, MC GRAW HILL.

2. PROGRAMMING IN ANSI C by E. BALAGURUSWAMY, MC GRAW HILL.

Course Code	DEMTH136	Course Title	DISCRETE STRUCTURES

	WEIGHTAGE	
	CA	ETE(Th.)
	30	70

Course Outcomes:

CO1: Write formal logical arguments using propositional logic

CO2: Discuss problem solving through the basics of combinatorics.

CO3: Relate basic discrete structures and algorithms.

CO4: Apply the concepts of trees to find the shortest path

CO4: Discuss properties of graphs and be able to relate these to practical examples.

CO5: Determine when a recursive solution is appropriate for a problem

Unit No.	Content
Unit-1	Sets, Description of a Set, Types of Sets, Subsets, Power Set, Venn Diagrams, Operation on Sets (Union, Intersection and Difference), Laws of Set Theory, Cartesian product of sets,
Unit-2	Relations, Functions, Some functions and their graphs (Identity, Polynomial, Modulus function and greatest integer function). One-One and onto functions.
Unit-3	Introduction to logic, Propositions and compound propositions, Basic logical operations (Conjunction, Disjunction, Negation), Propositions and truth tables,
Unit-4	Tautologies and contradiction, Logical equivalence, Conditional and biconditional statements.
Unit-5	Introduction to Logic Gates, Combinations of Gates, Implementation of Logic Expressions with Logic Gates and Switching circuits,
Unit-6	Introduction to Recursion, Recurrence Relation, Solving Recurrence Relation, Linear Homogenous Recurrence Relation with constant coefficient and their solution.
Unit-7	Introduction and Basic terminology, Graphs, Multigraphs, Degree of a vertex, Handshaking theorem, Sub graphs, Homeomorphic and Isomorphic graphs
Unit-8	Paths, Connectivity, Connected Components, Distance and Diameter, Cut points and bridges
Unit-9	Eulerian Graphs, Hamiltonian Graphs, Euler theorem, Planar Graphs, Maps, Regions, Euler Formula,
Unit-10	Non planar graphs, Kuratowski's Theorem (without proof). Graph coloring, Chromatic Number of a Graph
Unit-11	Complete graph and its coloring, Regular and Bipartite Graphs and their coloring.
Unit-12	Labelled and Weighted Graph, Shortest Path in weighted Graphs, Dijkstra's Algorithm to find shortest path
Unit-13	Introduction to Tree, Rooted Tree, Binary Tree,
Unit-14	Spanning Tree, Minimum Spanning Tree, Kruskal and Prims Algorithms to find minimum spanning tree

READINGS:

1. DISCRETE MATHEMATICS (SCHAUM'S OUTLINES) (SIE) by SEYMOUR LIPSCHUTZ, MARC LIPSON, VARSHA H. PATIL, MCGRAW HILL EDUCATION

Course Code	**DEENG139**	Course Title	**ENGLISH COMMUNICATION SKILLS**

WEIGHTAGES	
CA	ETE (Th.)
30	70

Course Outcomes:

CO1: Identify deviant use of English both in written and spoken forms and understand the importance of writing in academic life

CO2: Reorganize and correct the errors of usage to write simple sentences without committing errors of spelling and grammar

CO3: Assess their own ability to improve the competence in using the language

CO4: Understand and appreciate English spoken by people from different regions and read independently unfamiliar texts with comprehension

CO5: Use language for speaking with confidence in an intelligible and acceptable manner

CO6: Understand the importance of reading for life and develop an interest for reading

Unit No.	Content
Unit-1	**Grammar**: introduction to the sentence structure in English
Unit-2	**Grammar:** introduction to articles
Unit-3	**Grammar:** introduction to parts of speech
Unit-4	**Grammar:** common errors
Unit-5	**Listening Skills:** introduction to the importance of listening skills
Unit-6	**Listening Skills**: types of listening – informational, critical, empathetic listening
Unit-7	**Listening Skills**: problems of listening to unfamiliar dialects
Unit-8	**Speaking Skills**: aspects of pronunciation, introduction to vowels, consonants and diphthongs
Unit-9	**Speaking Skills**: fluency in speaking, intelligibility in speaking
Unit-10	**Reading Skills**: introduction to reading skills, types of texts – narrative, descriptive, extrapolative
Unit-11	**Reading Skills**: essential skills for reading comprehension – decoding, fluency, vocabulary, reasoning and background knowledge
Unit-12	**Writing Skills**: introduction to writing skills, cohesion and coherence, expansion of given sentence
Unit-13	**Writing Skills**: reorganizing jumbled sentences into a coherent paragraph, paragraph writing
Unit-14	**Composition**: introduction to letter writing, types of letters, notices, complaints, appreciation, conveying sympathies

READINGS:

1. OXFORD PRACTICE GRAMMAR by JOHN EASTWOOD, OXFORD UNIVERSITY PRESS
2. TEXTBOOK OF ENGLISH PHONETICS FOR INDIAN STUDENTS by BALASUBRAMANIAN, LAKSHMI PUBLICATIONS
3. OXFORD ADVANCED LEARNER'S DICTIONARY OF ENGLISH by DEUTER, M ET.AL. OXFORD UNIVERSITY PRESS
4. INTERMEDIATE GRAMMAR, USAGE AND COMPOSITION by TOCKOO, M. L., A. E. SUBRAMANIAM, P. R. SUBRAMANIAM, ORIENT BLACKSWAN PVT. LTD.

Course Code	DECHE110	Course Title	ENVIRONMENTAL SCIENCES

	WEIGHTAGES	
	CA	ETE (Th.)
	30	70

Course Outcomes:

CO1: Observe the current environmental issues and associated problems.

CO2: Illustrate the basic knowledge of environment and its various components.

CO3: Devise new approaches to reduce various types of environmental pollution.

CO4: Identify the environment policies and practices.

Unit No.	Content
Unit-1	**Multidisciplinary nature of environmental studies, Scope and importance:** Concept of sustainability and sustainable development, Land resources: Land degradation, soil erosion and desertification.
Unit-2	**Deforestation**: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
Unit-3	**Water**: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water, Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs.
Unit-4	**Ecosystem, structure and function of ecosystem, Energy flow in an ecosystem**: food chains, food webs and ecological succession ecological pyramids, Case studies of the following ecosystems: a) forest ecosystem b) grassland ecosystem c) desert ecosystem d) aquatic ecosystem.
Unit-5	**Levels of biological diversity**: genetic, species and ecosystem diversity, Biogeographic zones of India, Biodiversity patterns and global biodiversity hot spots, India as a mega diversity nation, Endangered and endemic species in India.
Unit-6	**Threats to biodiversity**: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions, Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity, Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and Informational value.
Unit-7	**Environmental pollution**: Types, causes, effects and controls; Air pollution, Ill-effects of Fireworks.
Unit-8	**Environmental pollution**: Types, causes, effects and controls: water, soil and noise pollution, Nuclear hazards and human health risks, Pollution case studies.
Unit-9	Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
Unit-10	**Environment Laws**: Environment Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act.
Unit-11	**International agreements**: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD), Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context, Solid waste management: Control measures of urban and industrial waste
Unit-12	**Human population growth**: Impacts on environment, human health and welfare.
Unit-13	**Disaster management**: floods, earthquake, cyclones and landslides, Environmental movements: Chipko, Silent valley, Bishnoi's of Rajasthan.
Unit-14	**Environmental ethics**: Role of Indian and other religions and cultures in environmental conservation, Environmental communication and public awareness

READINGS:

1. PERSPECTIVE IN ENVIRONMENTAL STUDIES by ANUBHA KAUSHIK, C P KAUSHIK, NEW AGE INTERNATIONAL PUBLISHERS
2. TEXT BOOK OF ENVIRONMENTAL STUDIES by D. DAVE AND S. S. KATEWA, CENGAGE LEARNING
   .

Course Code	DECAP200	Course Title	DATABASE MANAGEMENT SYSTEMS

	WEIGHTAGE		
	CA	ETE(Th.)	ETE (Pr.)
	30	40	30

Course Outcomes:

CO1: Understand the database concepts and database management system software.

CO2: Identify the basic concepts and various data model used in database design ER modelling concepts and architecture use and design queries using SQL.

CO3: Discuss the normalization theory and apply such knowledge to normalization of a database.

CO4: Apply and relate the concept of transaction, concurrency control and recovery in database.

CO5: Examine recovery system and to be familiar with cloud database and distributed databases.

Unit No.	Content
Unit-1	**Introduction to fundamentals of DBMS:** Database applications, Purpose of database systems, Components of DBMS, DBMS Architecture, Different Data Models, Data Independence, Various types of constraints
Unit-2	**Database design and ER model:** Overview of Design process, Entity relationship model, constraints, ER Diagrams, ER Design issues, Weak entity sets, extended ER features
Unit-3	**Relational Databases:** Relational Model, Structure of Relational databases, fundamental, additional and extended relational algebra operations, Views, DDL statements in SQL, DML statements in SQL, JOINS
Unit-4	**SQL (DDL):** Implementation of Data Definition Language, datatypes, schema definition, Basic structure of SQL Queries- CREATE, ALTER, DROP, RENAME, TRUNCATE
Unit-5	**SQL (DML):** DML commands - SELECT, INSERT, DELETE and UPDATE operations, implementation of constraints, implementation of joins, Nested subqueries, Complex queries, Views, Joined relations.
Unit-6	**Relational Languages**: Tuple Relational calculus, Domain relational calculus, Query by Example, Data log, Set Operations – UNION, INTERSECT, EXCEPT, Aggregate Functions, NULL values.
Unit-7	**Relational Database Design:** Features, Atomic Domains and first normal form, Functional dependency theory decomposition using functional dependencies, decomposition using Multivalued dependencies, More normal forms, database design process.
Unit-8	**Transaction Management:** Concept of Transaction, Transaction State, Implementation of atomicity and durability, concurrent execution, Serializability, Recoverability, Implementation of Isolation, testing for Serializability.
Unit-9	**Concurrency Control:** Lock based protocols, Timestamp based protocols, Validation based protocols, Deadlock handling, Insert and Delete operations, Weak levels of consistency
Unit-10	**SQL (DCL/TCL):** implementation of GRANT, REVOKE, ROLLBACK, COMMIT, SAVEPOINT, implementation of aggregate functions, implementation of inbuilt character functions, implementation of inbuilt numeric functions, implementation of inbuilt date & time functions
Unit-11	**Recovery system:** Failure classification, storage structure, recovery and atomicity, log-based recovery, recovery with concurrent transactions, buffer management, failure with loss of non-volatile storage.
Unit-12	**Distributed Databases:** Distributed Databases, Data Fragmentation, Replication and Allocation Techniques, SemiJoin, Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions.

Unit-13	**Cloud-Based Databases:** From collaborative to the Cloud – A short history, Introduction to Client – Server Computing, Peer-to-Peer Computing, Distributed Computing, Grid Computing, Collaborative Computing, Cloud Computing. Functioning of Cloud Computing, Differences between Distributed computing and Cloud computing.
Unit-14	**Introduction to PL/SQL:** introduction to PL/SQL blocks, conditional statements, loops, cursors and triggers.

LABORATORY WORK:

SQL (DDL): Implementation of Data Definition Language, datatypes, schema definition, Basic structure
of SQL Queries- CREATE, ALTER, DROP, RENAME, TRUNCATE

SQL (DML): DML commands - SELECT, INSERT, DELETE and UPDATE operations, implementation of constraints, implementation of joins, Nested subqueries, Complex queries, Views, Joined relations.

SQL (DCL/TCL): implementation of GRANT, REVOKE, ROLLBACK, COMMIT, SAVEPOINT, implementation of aggregate functions, implementation of inbuilt character functions, implementation of inbuilt numeric functions, implementation of inbuilt date & time functions

Introduction to PL/SQL: introduction to PL/SQL blocks, conditional statements, loops, cursors and triggers.

READINGS:

1. Author: H. F. Korth& A. Silberschatz, Title: Database System Concepts, Publishers: TataMcGraw Hill, New Delhi, Year 2006
2. Ivan Bayross, SQL, PL/SQL The Programming Language of Oracle, BPB Publication.
3. Elmasri&Navathe, Fundamentals of Database systems, Addison & Weisely, New Delhi.
4. C. J. Date, Database Systems, Prentice Hall of India, New Delhi.
5. P. Bhatia & G. Singh, Simplified Approach to DBMS, Kalyani Publishers.
6. Martin Gruber, Understanding SQL, BPB Publication, New Delhi.
7. Val Occardi, Relational Database: Theory & Practice, BPB Publication, New Delhi

Course Code	DCAP202	Course Title	OBJECT-ORIENTED PROGRAMMING

	WEIGHTAGE		
	CA	ETE(Th.)	ETE (Pr.)
	30	40	30

Course Outcomes:

CO1: Familiarize with the basic concepts of object-oriented programming

CO2: Understand the object construction, memory allocation and deallocation

CO3: Develop programs using object-oriented concepts like encapsulation, inheritance and polymorphism

CO4: Analyse the different behaviour of overloaded operations in different situations

Unit No.	Content
Unit-1	**Principles of OOP:** introduction, procedural vs object oriented programming, basic concepts of object oriented programming, object oriented languages, benefits of OOP's
Unit-2	**Basics of C++:** C Vs C++, a simple C++ program, compiling & linking, tokens, keywords, identifiers & constants, data types, reference variables
Unit-3	**Operators and type casting:** operators in C++, scope resolution operator, member de-referencing operators, type casting: implicit and explicit type casting
Unit-4	**Control structures:** decision making controls, iterative controls and jumping controls
Unit-5	**Pointers and structures:** main function, function prototyping, handling pointers, C structures and limitations
Unit-6	**Classes and objects:** specifying class, a sample C++ program with class, access specifiers, defining member functions, nesting of member functions
Unit-7	**More on classes and objects:** function definition inside the class and outside the class, private member functions, arrays within class, memory allocation of objects
Unit-8	**Handling functions:** function calling mechanisms: call by Value, call by address & call by reference, objects as function arguments
Unit-9	**More on functions:** inline functions, making outside function inline, friend functions
Unit-10	**Static members and polymorphism:** Static Data Members & Static Functions, Function Overloading
Unit-11	**Constructors and destructors:** constructors, parameterized constructors, copy constructor and dynamic constructor, multiple constructor in a class
Unit-12	**More on constructors and destructors:** constructors with default arguments, dynamic initialization of objects, destructors
Unit-13	**Inheritance:** defining derived classes, single inheritance, making a private member inheritable, multilevel inheritance, hierarchical inheritance, multiple inheritance, hybrid inheritance
Unit-14	**File handling:** file handling operations: open, close, read and write

LABORATORY WORK:

Implementation of C++ Programming Concepts (Classes and objects, inline functions, friend functions, constructor and destructors, function overloading, inheritance, working with files)

READINGS:

1. OBJECT ORIENTED PROGRAMMING WITH C++ by E BALAGURUSAMY, MC GRAW HILL
2. LET US C++ by YASHAVANT KANETKAR, BPB PUBLICATIONS
3. OBJECT ORIENTED PROGRAMMING IN C++ by ROBERT LAFORE, GALGOTIA PUBLICATIONS
4. THE C++ PROGRAMMING LANGUAGE by BJARNE STROUSTRUP, PEARSON

Course Code	**DECAP256**	Course Title	**COMPUTER NETWORKS**

	WEIGHTAGE		
	CA	**ETE(Th.)**	**ETE**
	30	**40**	**30**

Course Outcomes:

CO1: Examine the importance of data communication in daily activities

CO2: Recognize the different networking devices and their functionalities

CO3: Utilize the role of protocols in networking and analyse the services and features of the various layers of network

CO4: Validate the program, date and hardware is available to everyone on the network without regard to the physical location of the resource and the users

Unit No.	Content
Unit-1	**Introduction to computer networks:** definition, characteristics, applications and classification of computer networks –PAN, LAN, MAN, WAN, internetworks, network topology.
Unit-2	**Data communication:** data communication components, characteristics, transmission impairments, transmission modes, protocol – its component and functions.
Unit-3	**Network models:** layered architecture, benefits of layered architecture, OSI reference model, TCP/IP protocol suite, functions of layers in OSI and TCP/IP models.
Unit-4	**Physical layer:** services of physical layer, transmission medium – wired and wireless, networking devices.
Unit-5	**Data link layer - error detection and correction methods:** one and two dimensional parity method, hamming code, cyclic redundancy c heck (crc); framing- character stuffing, bit stuffing.
Unit-6	**Data link layer - flow and error control protocols:** protocols for noiseless and noisy channels - simplest protocol, stop-and-wait protocol; stop-and-wait ARQ, go-back-n ARQ, selective repeat ARQ.
Unit-7	**Data link layer - medium access control protocols:** pure ALOHA and slotted ALOHA, persistent and non-persistent CSMA, CSMA/CD, CSMA/CA
Unit-8	**Network layer - logical addressing:** IPV4 addressing, classful addressing, classless addressing, subnetting, network address translation, IPV6 addressing, address resolution protocol (ARP), reverse address resolution protocol
Unit-9	**Network layer – routing: unicast routing:** routing characteristics, routing algorithms, comparison of routing algorithms. **broadcast and multicast routing:** broadcast routing, multicast routing, routing in adhoc networks.
Unit-10	**Transport layer - protocols:** services of transport layer, connection oriented and connectionless services, connection establishment, connection release, TCP, UDP.
Unit-11	**Transport layer - congestion control and QoS:** general principles of congestion control, congestion avoidance and prevention policies; quality of service- types of traffic, traffic shaping, leaky bucket algorithm, token bucket algorithm.
Unit-12	**Application layer – services and protocols:** remote login (TELNET), file transfer protocol (FTP), domain name system (DNS), e-mail - simple mail transfer protocol (SMTP), post office protocol (POP), internet message access protocol (IMAP).

Unit-13	**Internet and WWW:** internet basics, hypertext transfer protocol (http), world wide web (www), security in internet – IPsec, VPN.
Unit-14	**Network Security:** goals of network security, principles of cryptography, message integrity, securing e-mail, operational security: firewalls, types of firewalls.

LABORATORY WORK:

Network models: layered architecture, benefits of layered architecture, OSI reference model, TCP/IP protocol suite, functions of layers in OSI and TCP/IP models.

Network layer - logical addressing: IPV4 addressing, classful addressing, classless addressing, subnetting, network address translation, IPV6 addressing, address resolution protocol (ARP), reverse address resolution protocol

READINGS:

1. DATA COMMUNICATION AND NETWORKING by B.A. FOROUZAN, MCGRAW HILL EDUCATION
2. DATA AND COMPUTER COMMUNICATIONS by WILLIAM STALLINGS, PEARSON

Course Code	DECAP268	Course Title	COMPUTER SYSTEM ARCHITECTURE

	WEIGHTAGE	
CA	ETE(Th.)	ETE (Pr.)
30	40	30

Course Outcomes:

CO1: Classify the functioning of digital systems and discuss the working of gates and circuits

CO2: Identify the factors influencing the design of hardware and software elements of computer system

CO3: Evaluate the various processor components and their interconnection

CO4: Analyze the types of instructions and interrupts in computer system

Unit No.	Content
Unit-1	**Binary Systems:** Number System, Number System Conversions, Complements, Fixed point and floating point representation
Unit-2	**Boolean algebra:** Basic definitions of Boolean algebra, Axiomatic definition of Boolean algebra, Basic theorems and properties, Boolean functions, Karnaugh map & tabulation methods
Unit-3	**Implementation of combinational logic design:** Logic gates and combinational circuits, Binary adder and subtractor, Decimal adder, Encoder and decoder Multiplexer and demultiplexer, Binary parallel adders
Unit-4	**Design of synchronous sequential circuits:** Sequential circuits, Latches and flip-flops, Analysis of clocked sequential circuits, State reduction and state assignment, Design of counters, Shift registers and ripple counters
Unit-5	**Register Transfer and Microoperations:** Register Transfer Language, Register Transfer, Bus and Memory Transfer, Arithmetic Microoperations, Logic microoperations, Shift Microoperations
Unit-6	**Instruction Codes and Instruction Cycle:** Instruction codes, Common Bus System, Timing and control, Instruction Cycle, Types of instructions
Unit-7	**Machine Language:** Introduction of Machine Language, Assembly Language, Assembler Basics, program loops
Unit-8	**Machine Programming:** Arithmetic and Logic Operation programming, Subroutines, Input-Output programming, Programming loops
Unit-9	**Register Organization:** General Register Organization, Organization of stacks, Reverse Polish Notation
Unit-10	**Addressing Modes:** Addressing Modes, RISC Instructions, Zero Address Instructions, One Address Instructions, Two Address Instructions, Three address Instructions
Unit-11	**Pipeline processing:** Instruction and arithmetic pipeline, Pipeline hazards and their resolution, Parallel processing
Unit-12	**Memory technology:** Cache memory and memory hierarchy, Virtual memory and memory management unit, Memory hierarchy, Associative memory, Cache memory
Unit-13	**I/O subsystems:** Input-output devices, Interfacing with IO devices, Concept of handshaking, DMA data transfer, Asynchronous data transfer
Unit-14	**Hardware description logic:** Introduction to hardware description language, HDL for combinational circuits

Laboratory Work

Implementation of combinational logic design: Logic gates and combinational circuits, Binary adder and subtractor, Decimal adder, Encoder and decoder Multiplexer and demultiplexer, Binary parallel adders

READINGS:

1. COMPUTER SYSTEM ARCHITECTURE by MORRIS MANO, PEARSON
2. DIGITAL LOGIC AND COMPUTER DESIGN by MORRISMANO, M., PRENTICEHALL
3. COMPUTERARCHITECTURE: A QUANTITATIVE APPROACH by DAVID APATTERSON, PRENTICEHALL

Course Code	DEENG140	Course Title	ADVANCED ENGLISH COMMUNICATION SKILLS

	WEIGHTAGE		
	CA	ETE(Th.)	ETE (Pr.)
	30	40	30

Course Outcomes:

CO1: Read and understand longer pieces of discourse independently

CO2: Read and compare two texts for evaluating them

CO3: Summarise a text for the benefit of peers orally or in writing

CO4: Write a review of a text read for academic purpose or pleasure

CO5: Understand the purpose and process of communication

Unit No.	Content
Unit-1	Reading texts of different genres and of varying length
Unit-2	Different strategies of comprehension
Unit-3	Reading and interpreting non-linguistic texts
Unit-4	Reading and understanding incomplete texts (Cloze of varying lengths and gaps; distorted texts.)
Unit-5	Analyzing a topic for an essay or a report
Unit-6	Editing the drafts arrived at and preparing the final draft
Unit-7	Re-draft a piece of text with a different perspective (Manipulation exercise)
Unit-8	Summaries a piece of prose or poetry
Unit-9	Using phrases, idioms and punctuation appropriately
Unit-10	Introduction to communication – principles and process
Unit-11	Types of communication – verbal and non-verbal
Unit-12	Identifying and overcoming problems of communication
Unit-13	Communicative competence
Unit-14	Cross-cultural communication

READINGS:

1. Pal, Rajendra et al (2019). English Grammar and Composition. Sultan Chand.
2. Bailey, Stephen (2003). Academic Writing. London and New York, Routledge.
3. Department of English, Delhi University (2006). Fluency in English Part II. New Delhi, OUP
4. Grellet, F (1981). Developing Reading Skills: A Practical Guide to Reading Skills. New York, CUP
5. Hedge, T. (2005). Writing. London, OUP
6. Kumar, S and PushpLata (2015). Communication Skills. New Delhi, OUP
7. Lazar, G. (2010). Literature and Language Teaching. Cambridge, CUP
8. Nuttall, C (1996). Teaching Reading Skills in a Foreign Language. London, Macmillan
9. Raman, Meenakshi and Sangeeta Sharma (2011). Technical Communication: Principles and Practice. New Delhi, OUP